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Original Articles.

ACCESSORY SINUS BLINDNESS. DIFFERENTIAL DIAGNOSIS AND OPERATIVE TECHNIC.

BY LEON E. WHITE, M.D., BOSTON.

As there has recently been much just criticism of the unwarranted opening of accessory sinuses in loss of vision due to intracranial lesions, and as fatalities also have been reported, there is danger that the pendulum will swing too far the other way and that an operative procedure of the utmost benefit in suitable cases will be discredited.

Realizing that in previous articles many points have not been clearly expressed and not a few exceptions taken (some of them very good ones), I wish to re-present the subject and discuss the objections and criticisms that have come to my attention.

While it is right that one should stand by whatever is of true worth, it is not right, simply because an opinion has once been expressed, to hold it in obstinate blindness after it has been proven erroneous. The cultivation of the habits of continual self-correction and self-abnegation will promote the interests of those poor unfortunate we are endeavoring to benefit, vastly more than retaliation.

In a study of a subject like this, one is always getting new facts and ideas and discarding those which are untenable. Honest criticism, therefore, is of enormous benefit, otherwise there would be little or no progress. Cordial co-operation rather than antagonism between the cerebral surgeon, the neurologist, the ophthalmologist and the rhinologist is most essential. Believing with Sir Thomas Browne, that "in all disputes, so much there is of passion, so much there is of nothing to the purpose: for then Reason, like a bad Hound, spends upon a false scent, and forsakes the question first started."

The subject will be considered under the following heads:

- First: Differential Diagnosis.
- Second: Recovery, with or without Operation.
- Third: Operation with so-called "Negative Nasal Findings."
- Fourth: Operative Technic.
- Fifth: Fatalities.

A history of early loss of vision directly in front of the eye and ability for some time to see sideways, suggests a central scotoma which is a point of great value in diagnosis of accessory sinus blindness. According to de Schweinitz, "the affection appears to depend upon an interstitial neuritis, most severe in the optical canal, and at first chiefly located in the papillo-

macular tract, from which it may extend, however, until the whole diameter of the nerve is involved." Visual fields (where there is sufficient sight to make one) are of the utmost value, but in many cases there is not even light perception. In many of the brain tumor lesions, the central field may be good or there may be a bi-nasal or bi-temporal hemianopsia or a homonymous hemianopsia.

The various other causes of retrobulbar and optic neuritis should be given consideration, and I will mention the principal ones:

Local Causes—Cellulitis of orbit; infections of orbit; wounds of orbit; tumors of orbit; thrombosis of orbital veins; hemorrhage into nerve sheath; wounds or tumors of optic nerve or globe; infection from accessory sinuses.

Intracranial Causes—Pituitary lesions; tumors; hemorrhage; hydrocephalus; abscesses; cavernous sinus thrombosis.

General Causes—Acute febrile diseases; nephritis; influenza; anemia; diabetes; syphilis; toxemia from lead, tobacco, alcohol, etc.; toxemia from *pus foci* (accessory sinuses); methyl alcohol; Leber's disease.

It is of the utmost importance to rule out acoustic and other brain tumors, as well as multiple sclerosis and allied conditions. A careful but not especially difficult neurological examination should, therefore, be made. The following list of questions and tests is, with some slight modification, the one used at the Brigham Hospital, and I am indebted to Dr. H. H. Vail for drawing it up.

NEUROLOGICAL EXAMINATION.

NAME, address, occupation.

HUSBAND OR FAMILY: H, F, M, S, B.

PAST HISTORY. Including operations on head, nose, ears, eyes, mouth, injuries, cardio-respiratory, gastro-intestinal, genito-urinary, neuro-muscular, catamenia. Habits: Tea, coffee, alcohol, tobacco, drugs. Weight.

PRESENT ILLNESS. Complaints, headaches, visual disturbances, dizziness, nausea and vomiting, unsteadiness, convulsions. *Sensory and Motor Disturbances*: Diplopia, epilepsy, Jacksonian seizures, tinnitus, deafness, facial palsy, sensory disturbances. *Disturbances of Higher Psychical Functions*: Amnesia, aphasia, bi-nasal hemianopsia, bi-temporal hemianopsia, visual and auditory hallucinations, loss of sexual power, obesity, polydipsia, polyuria, increased appetite, especially for sweets; lowering of bodily temperature, amenorrhea, sterility, overgrowth of skeletal frame, loss of vigor, dryness of skin and hirsutes, character of headache and general progress of symptoms. *Uncinate*

Attacks, Olfactory hallucinations, "brown study." *General Appearance and Condition*.

CRANIAL NERVES. *Olfactory*: Subjectively, any disturbance. Objectively, vanilla RT., LFT.; ammonia RT., LFT.; camphor RT., LFT. *Optic*: Vision RT., LFT.; fundi RT., LFT.; visual fields. *Motor Oculi*: Pupils, RT., LFT. *Muscle Movements* Strabismus, ptosis.

Patheticus: Superior oblique. *Trigeminal*: Subjective—Numbness, tingling, anesthesia of face, anesthesia of tongue; Objective—Corneal reflexes sensation tested pinprick, sensation tested dull object, sensation tested hot and cold tubes, sensation tested light stroking, cotton stick. *Motor*: Contraction masseters, contraction pterygoids. *Abducens*: External rectus.

Facial: Movements of face (central v. peripheral): taste (anterior 2/3 tongue)—Salt RT., LFT.; sugar RT., LFT.; quinine RT., LFT. *Acoustic*: *Cochlear*—R, W, L; tinnitus, W, V, AC, BC, D, G. *Vestibular*, pass-pointing before syringing: left arm; right arm. *Barany test*.

Glossopharyngeal: (sensory nerve to nasopharynx, pharynx soft palate, posterior 1/3 tongue). Motor bres to swallowing muscles): Subjective—Anesthesia of throat, regurgitation of food; Objective—Sensation of soft palate (cotton stick both sides throat), movements soft palate. *Vagus*: Hiccoughs, pulse and heart beat, vocal cords, hoarseness, trouble swallowing. *Spinal Accessory*: Elevation of trapezius, elevation of sterno-mastoid. *Hyper-Glosso*: Protrusion of tongue, atrophy of tongue.

CEREBRUM. Right or Left Handed? *Frontal Lobes*: Memory, intelligence, sense of smell, speech (motor)—spontaneous writing, writing from dictation. *Pre-Central (Motor functions)*: Arms, legs, trunk. *Post-Central (Sensory functions)*: Arms, legs, trunk. *Temporal Lobes*: Homonymous hemianopsia, visual speech, auditory speech, sensory speech. *Occipital Parietal*: Visual hallucinations, hemianopsia (gen. complete is due to tumor). *Parietal Lobe*: Stereognostic sense.

CEREBELLUM. Gait, balance or Romberg, nystagmus. *Coordination*: Hands on table, move pronate and supinate; finger to nose, finger to finger, thumb to fingers; rapid finger movements. *Adiakokinesia*. *Pass-pointing*: Left, right.

VASOMOTOR. Any disturbance of: flushing, perspiration, cyanosis, erythema, dermographia—upper right, lower right, upper left, lower left.

SPHINCTERS. Involuntary urination, involuntary bowel movements.

PHYSICAL EXAMINATION. Skin, head, eyes, nose, ears, mouth, neck, glands, thorax, lungs, heart, pulses. *Blood Pressure*: Systolic, diastolic. *Abdomen. Extremities*: Length, cushioned, tremor, clubbing, edema, scars or ulcers. *Reflexes*: Knee jerk, ankle jerk, Babinsky, abdominal, cremasteric, Kernig. *Rectal*. *Pelvic*.

SUMMARY. Subjective. Objective—X-ray of sinuses, sella turcica, skull, finger joints (for pituitary), Wassermann, urinary analysis.

Recovery with or without Operation.

As to this second division, by all means, let the non-surgical method be given a fair trial. In the typical case of retrobulbar neuritis, where the eye is slightly sensitive to pressure, with occasionally some exophthalmus, even with complete loss of vision, recovery without operation frequently takes place. There is this to be said, however: There must be some condition in the accessory sinuses that renders the optic nerve susceptible to either pressure or infection. If there is evidence of suppuration, its source should be sought and eliminated. It is also good judgment to correct any predisposing conditions, such as marked enlargement of the middle turbinate or a deflected septum.

To illustrate when and when not to operate: In the case of large middle and superior turbinates which normally almost block the posterior sinuses, it takes but slight swelling plus some infection, to produce an inflammatory process which extends by continuity of tissue to the optic nerve. Permanent impairment of vision may result before the turbinates of this type sufficiently subside to permit ventilation, hence the necessity for operative interference. While, on the other hand, an acute swelling in the middle and superior turbinates normally not hypertrophied and not in such intimate relation with the posterior sinuses, may subside quickly without impairment of the nerve. This latter type can usually be treated successfully, as I have proved in several instances, and two such cases will be found at the end of this paper. Hypertrophied middle turbinates were removed in two cases (Nos. 3 and 6) that gave a history of previous attacks, even when the eye was well on the road to recovery. This was done to prevent further recurrences, and has proved successful up to the present (five years in one case, three years, four months in the other). Had this method been followed in Case 16, the final outcome might have been equally good. This patient gave a history of having noticed on awaking, a constantly present blue spot in front of the right eye and everything blurry. Under constitutional treatment, this cleared up in about three weeks, and for a year the vision was normal. Then there was a recurrence and valuable time lost while awaiting the return of the

vision as before, but in spite of treatment, it went from bad to worse. When I first saw him, some two years later, it was only 20/200 and the nerve was white. There was a marked deviation of the septum to the right, and the middle turbinate was tightly wedged between it and the ethmoidal wall. This man had been most carefully investigated,—he underwent thorough physical, neurological, dental, rhinological, ophthalmological, roentgen ray and Wassermann examinations, but no explanation was forthcoming as to the etiology. The importance of the blocking by the hypertrophied middle turbinate and deflected septum was not appreciated, and deflected septum was not appreciated, and nothing was done during the period when he might have been benefited.

Each case should be considered on its own merits and the possibility of recurrence borne in mind. The size and position of the middle and superior turbinates are, I believe, the key-stone to this question of recovery with or without operation.

By the term, superior turbinates, is meant the one and occasionally two structures located above the middle turbinate and variously designated as upper, superior, supreme, third or fourth turbinates. Where there is a fourth turbinate the sphenoidal ostium is high, as it always opens into the superior sphenoethmoidal fissure.

That blindness may result, and that speedily, unless the accessory sinuses receive prompt attention, cannot be too greatly emphasized. From statistics, I am endeavoring to determine somewhat on a chronological basis, somewhat on the degree of loss of vision and principally from the size and position of the turbinates, how long one can safely delay.

In one of my retrobulbar cases (No. 24, Thompson), there was complete unilateral loss of vision for eleven days before the patient could be persuaded to enter the Infirmary. The nerve was turning white when the sinuses were opened. Following her discharge, three days after the operation, she contracted influenza, and when she returned, five weeks later, there was well developed optic atrophy. She could, however, make out fingers at six inches. This case well illustrates how quickly permanent impairment of the optic nerve can take place. If she had not contracted the influenza, and it had been possible to treat the sphenoid by hot

irrigation and argyrol, more of the vision might have been saved.

Another case (No. 22) a colored girl, came to the Eye Department of the Eye and Ear Infirmary a week after onset of what was diagnosed as a unilateral retrobulbar neuritis, with complete loss of vision. She was referred to the, Massachusetts General Hospital for examination. As lues was suspected, a Wassermann and lumbar puncture were taken, and she was not sent to the Aural Department until five weeks after the onset of the trouble. The nerve at this time showed marked pallor but as the middle turbinate was hypertrophied and the other findings negative, the accessory sinuses were drained. Two days after operation the patient was able to distinguish hand movements. She contracted a severe cold and lost this slight gain. The pallor of the nerve increased, and when she was discharged, at the end of ten days, there was not even light perception. The fundus, some three months later, showed marked optic atrophy. This case might have been benefited by an earlier operation. It, at least, confutes the saying that *all* these cases recover spontaneously.

Another case of unilateral retrobulbar neuritis (No. 18, Mosher) of four weeks' duration, illustrates how quickly improvement may commence in an eye becoming progressively worse. Vision 20/100, slight pallor on temporal side of disc, eyesight had failed rapidly during the previous week. The patient had a severe cold, with pain through forehead, a week before the onset of haziness. The septum was deflected to the opposite side, but the middle turbinate on the affected side was enlarged and especially obstructive. The usual operation. Thickened tissue found. Recovery rapid. Two weeks after operation, vision was 20/30 and eventually became normal, although a slight pallor of the disc remained. Could one, with safety to the eye, have waited longer for return of the vision?

Still another case of four weeks' standing (No. 14, Kumerano), a child of five years, had bilateral neuro-retinitis with total loss of vision, for three weeks. Fundi showed stellate exudates and dilated veins. Slight deviation of septum high up, and both middle turbinates swollen. Case treated a week without relief, then middle turbinates removed and ethmoids opened. Light perception two days after operation. In six weeks the child could count fin-

gers at 20 feet, but considerable pallor of disc remained.

It illustrates the seriousness of optic neuritis and the necessity of early operation. How much longer would one have been justified in waiting in a case like this? The child was under observation a week and operated on only as a last resort, as it was considered a difficult and dangerous procedure. An earlier operation might have saved more of the vision, but how much better to have impaired vision than none at all! Dr. H. B. C. Riemer, who has followed the child, thinks he sees well enough to attend the public schools.

The objectors say the operation is so frequently done just before the patient would commence to improve anyway, that it proves nothing. This is a difficult argument to answer, as the case generally is operated upon, or at least should be, before there is atrophy. There is this to be said: As there was great variation as to the time of operation after the loss of vision, one must have had an unusual insight into the future to hit upon that identical period when nature was just ready to do the work that we, in our impatience, took away from her. Thus, six operations were performed within the first week, and all recovered with normal vision; probably some would have recovered without, but why did not the five done within two weeks show equally good results? Two of these five did recover, with normal vision; two with slight impairment, i.e., 20/20—and pallor of the nerve; the fifth case only recovered enough to count fingers at six inches, and had marked optic atrophy. Of the four cases operated on between the second and fourth week, normal vision, but with some pallor of the nerve, was obtained in but one; and while the three others improved, in none did the vision ever approximate the normal.

Take the four cases operated on between one and two months: one recovered with normal vision, a second with slight impairment, and the best a third could do was to count fingers at three feet, and the fourth did not even have light perception.

Of the five cases operated on of over two months' duration, there was no improvement in two, and it was so slight in the other three as to be almost negligible. If statistics are of any value, they show that early operations do accomplish vastly more than late ones and that the optic nerve can be permanently damaged

within eleven days. Each case must be individually considered, there being no time rule applicable to all. The fundus should be carefully watched. Commencing pallor or undue engorgement indicate the advisability of unloading the congestion.

In what field of surgery does one operate only on the cases that would otherwise have succumbed? Surely, many an appendix has been removed unnecessarily. How many mastoids are opened that would have terminated fatally? We continue to open mastoids, and the appendix operation is not ancient history. Just because these operations are sometimes needlessly performed, would not one be shortsighted to condemn all these life-saving procedures? It requires judgment to determine what cases to watch and what ones to operate upon. There comes a time when the skilled surgeon considers the interests of his patient are safeguarded better by attacking the infection surgically than by waiting. This argument applies just as truly to one who has lost vision. Unnecessary surgery cannot be too strongly condemned. The surgeon should be reasonably assured of the diagnosis, and then if the safety of the eye is best conserved by draining the sinuses, he should, by all means, go ahead, presupposing, of course, that the operator is competent and that he does not perform too radical an operation.

It seems a pleasing diversion for many to tell of such and such a case of theirs with almost or quite complete loss of vision, that recovered without operation. I wonder how many mention the case that did *not*? I have been told of many of these unfortunates and have seen not a few. One of them (Case 27) is given in detail at the end of this paper.

OPERATIONS WITH SO-CALLED "NEGATIVE NASAL FINDINGS."

In a previous article, I unfortunately, was rather vague in expressing how little was evident on inspecting some of these noses, the phrase being, "that many of these cases have a condition so elusive as to be difficult of detection, either microscopically or macroscopically, and case after case has demonstrated that pressure sufficient to cause atrophy of the nerve can take place in a nose that on both inspection and Roentgen ray examination shows practically nothing abnormal." This has been interpreted by some as meaning that I advocated operating

on normal noses, and by others that there was no pathology in these sinuses. The expression, "*practically nothing abnormal*," had been the report in so many cases, before the importance of blocking by the middle and superior turbinates was recognized, that use was made of it in an endeavor to impress on the rhinologists how little should be expected from merely looking into the nose. The diagnosis was to be made largely by excluding other possible causes, i.e., after negative "medical neurologic, dental and Wassermann examinations." Then, when the condition of the eye was unimproved or becoming progressively worse, it was advised that the middle turbinate should be removed and the posterior sinuses opened, even if they appeared negative. This advice was given because it was often impossible to tell on inspecting the nose what was taking place in the sinuses. As this talk about negative nasal findings was on the second page, and the advice *not to operate* until after a *thorough investigation* was on page 3, it would seem that no one got beyond page 2. Let me emphasize now what *should* have been more clearly expressed before, that *normal noses do not produce loss of vision*; but in many that *seem* normal, there is infection, even if not evident.

Not having known what to look for until I had seen 10 or 12 cases, I was trying to impress on the rhinologists that they must get away from expecting to detect marked infection in the sinuses by simply inspecting the nose. An obstructive middle turbinate that might easily have escaped attention has been all that was seen in several cases where marked changes were found in the sinuses on operating.

To corroborate this view of operating with so-called negative nasal findings, after the exclusion of other possible causes, the following extracts are taken from the writings of men whose opinions are respected by the rhinologists and ophthalmologists throughout the country:

BECK says: "I often wonder if in some of these cases it would not be wiser to operate immediately and then make a Wassermann or other diagnostic measures, because while waiting to make a diagnosis by exclusion, the nerve may be irreparably damaged by the swelling. It will be admitted that a latent lues may exist in a non-luetic sinus disease and many a so-called toxic amblyopia has been treated by withholding tobacco and alcohol, and have gone blind, while the sinus disease was not taken into

consideration because there was no pus in the nose or the x-ray was negative."

ONODI, who has written and studied this subject more than anyone else, says:

"I must emphasize this fact, that in those cases of sight derangements in which the oculist cannot confirm the cause, and the suspicion of nasal connection exists, even though the findings be negative, it seems best to take explorative measures, and to seek the cause in the accessory sinuses, whether or not the presence of latent foci is suspected."

POSEY: "The connection between the sinuses and an ocular inflammation can often be made only after very skillful and repeated examinations. Until within a very short time, many ophthalmologists dismissed the possibility that an ocular inflammation could have originated in a sinusitis, by the patient's declaration that he did not have at the time, or shortly after, a bad cold in his head, or by the statement of an assistant, who took but a hasty view of the nares, that there was no pus in the nose. . . . That *congestion of the sinus without exudation*, is sufficient to occasion ocular symptoms—I have seen demonstrated in cases where competent rhinologists had failed to discover any exudate in the sinus whatever. . . . There were cases of retrobulbar inflammation of the optic nerve which were observed in earlier years, following gripe and in association with catching cold or rheumatism, where in place of the simple and effective treatment directed to the sinuses, they received active and often depressing and harmful general medication; as a consequence, blindness was the not infrequent result."

DE SCHWEINITZ says that the sinuses have been frequently neglected, or that rhinoscopic examination had failed to detect sinus infection where later investigations or later results have demonstrated well marked disease. Also,

"No patient with retrobulbar neuritis should escape searching examination of the nasopharynx, the ethmoid, frontal and sphenoidal sinuses. . . . Operation with suitable drainage may speedily relieve the ocular conditions. If this is neglected, blindness may result. . . . The most important group of ocular complications of nasal sinus disease are those in which there is sinusitis without external signs of orbital inflammation; there is an optic neuritis or a neuro retinitis without marked ophthalmic changes, simply a central scotoma. The scotoma may be unilateral, the more usual condition, or bilateral, and most frequently depends upon disease of the posterior ethmoidal cells or the sphenoid sinus. Investigations of ONODI have shown that the optic nerve often is in close relation with the posterior ethmoidal cells and that the thinness of the intervening

wall renders involvement easy, often easier, it is probable, than in the case of the sphenoid, which anatomically may come in close relationship with the nerve and form the inner wall or the lower and inner wall of the optic canal. According to Birch-Hirschfeld, the nerve lesion consists in edema, swelling and proliferation of the glia cells and destruction of the nerve fibers. These he attributes to venous stasis and also to toxic agencies. . . . The author has seen elaborate optic neuritis followed with optic nerve atrophy with extensive disease of the ethmoid, frontal and sphenoid sinuses. . . . The visual fields in disease of the sphenoid sinus may exhibit alterations analogous to those in afflictions of the pituitary body. . . . If the cause of these optic nerve complications is not recognized and speedily removed either by suitable intranasal drainage, with or without operation, blindness from optic nerve atrophy is likely to result."

VAN DER HOEVE says: "Enlargement of the blind spot for white and colors points with great probability to diseases of the posterior nasal accessory sinuses and justifies operative interference for this disease if there are no other discoverable causes for its presence. Early treatment can cure the optic nerve affection."

HARMON SMITH: "It is unquestionably a justifiable procedure to operate on these sinuses when every other possible cause of the neuritis has been eliminated. Even where there is no local or intranasal evidence of the existence of an empyema, such interference may be justified as an exploratory operation, and, when performed by one familiar with the anatomy, it is without material danger to the patient. The mere depletion incident to such an operation will in itself prove of value if the neuritis is due to the pressure of a diffuse inflammation."

DR. JAMES BORDLEY, JR.: "It has been my fortune to see a fair number of optic nerve lesions, produced by quite evident sinus disease; and it has also fallen to my lot to meet more than a few which could be determined only by close and repeated observations. There is, I believe, a too frequent study of intranasal disease by physicians who judge the probability of ocular complication by the extent of disease found; there are others who apparently conclude that, without visible evidence in the nose, it is fair to assume that no sinus disease exists. Often, neither of these assumptions is correct, and they may lead to very serious consequences. When a general surgeon stands between doubt and certainty as to intra-abdominal disease, he generally plays safe by 'looking' into the peritoneal cavity. Assuming that the operator is qualified, and assuming also that all other probable causes have been eliminated and that every means of diagnosis has been resorted to, I will suggest that when you are face to face

with a serious optic nerve disturbance, the part of conservatism and good judgment requires an operative exploration of the ethmoidal and sphenoidal cells. I feel quite confident that visual disturbances are frequently the first suggestions of serious sinus disease, which may eventually lead to blindness or to death. It is only fair, then, to heed the warning and eradicate the disease before it has impaired function or destroyed life."

ARNOLD KNAPP says: "Optic neuritis of nasal origin occurs in two forms; one during the course of suppurative sinusitis, the other where there is a typical retrobulbar neuritis and the rhinoscopic examination is negative. In the latter cases exploratory operation reveals a latent infection. The more acute the case, the more rapid the loss of vision and the better the prognosis. The effect of the nasal operation is remarkable. The nasal diagnosis in these acute cases is often difficult; even with negative rhinoscopic findings an exploratory operation must frequently be undertaken."

VAIL: "The disease should be recognized and operation on the ethmoid performed at once, in spite of its being normal in appearance. The diagnosis is made solely from ocular findings. The prognosis is good as to restoration of vision if the operation is performed during the acute stage, but if it is delayed until atrophy sets in, the prognosis is bad."

LOESER says: "The first two cases which present features of unusual interest are reported to call attention to the rapidity with which serious eye symptoms may disappear after appropriate nasal treatment. Furthermore, the ready recovery for the serious eye lesions, under the circumstances, is as convincing of their nasal origin as anything could be, short of autopsy findings."

LOESER AND WIENER: "Conditions, such as swelling of the papilla and optic neuritis associated with blindness, almost miraculously and instantly relieved by intranasal operation, are probably of vascular origin comparable to edema glottidis occurring in connection with a severe infection of nearby tissues. . . . Most of the eye complications, connected with the nose result from acute or chronic suppuration of the paranasal sinuses, but some of the more interesting ones may follow acute inflammatory processes with little or no pus."

As to the *type of operation*, the one which is advised, and seems in every way sufficient to ventilate and drain the sinuses adjacent to the optic nerve, is a modification of what Hajek and Skillern designate as the *radical sphenoid*. In their radical operation there is an exenteration of all the posterior ethmoids and the sphenoid, and also the complete removal of the

middle and superior turbinates. In the method I advocate, only enough of the turbinate tissue needed to obtain access to the front wall of the sphenoid is removed. The nasal portion of the anterior sphenoidal wall is taken down and only the posterior ethmoid cell opened. To my mind, there is no indication for exenterating the ethmoids unless they are so diseased that they need removal irrespective of the visual disturbance. The ventilation and depletion incident to the operation outlined will relieve the pressure and infection about the nerve. This will *neither unnecessarily* imperil the life of the patient *nor injure* the function of the nose. In none of the cases followed, has there been any crusting or dryness, the patients almost invariably testifying that the side operated on was much better than the other, this doubtlessly being due to the removal of the middle turbinate.

While I do not feel that one would be justified in doing a complete sphenoid and ethmoid exenteration, unless marked pathology was evident, it should be said in fairness to those advocating such an operation that it would relieve the engorgement.

That this advice may not be considered too conservative, let me quote SKILLERN in an article discussing operations on the ethmoids:

"In the uncomplicated cases of purulent ethmoiditis without polyp formation after the removal of the middle turbinate, the results obtained are usually inversely to the extent of the surgical disturbance; in other words, the greater the operative interference the less likelihood of return to normal and ultimate cure. Experience shows that once the middle turbinate is disposed of, the ethmoid labyrinth lends itself to conservative treatment and responds correspondingly with much greater facility than heretofore. In addition to this, the relations having been undisturbed, the ethmoid capsule and cells remain uninjured and intact. After a week or ten days, in how much more favorable a position are we to study and treat the pathological process, not to mention the benefit derived from the aeration and drainage affected by the turbinectomy. The infection will have a tendency to limit itself to one or a small group of cells which only the most careful and persistent study will disclose. This being finally accomplished, it is a comparatively easy matter to install a large opening in their most dependent parts with a suitable hook, thus permitting aeration and drainage which, coupled with irrigation, soon eliminates the active infection and puts the parts on the road towards resolution. In this instance the actual

surgical interference has been small; therefore, the function of the nose will be unimpaired and the cure may be termed physiological, as well as therapeutic, leaving nothing to be desired. . . . Operative procedures upon the ethmoid, unless slowly, carefully and systematically carried out, are most apt to spell disappointment, and radical operations upon this structure do not, by any means, always end in radical cures."

"The sphenoidal cavity, after the radical operation becomes more or less filled with granular tissue," and he adds that he has never seen a dry nose follow, no matter how extensive the procedure. As to the value of the operation, mention is made of the dramatic results obtained where grave cerebral and orbital symptoms have threatened. Many cases of progressive blindness have been reported which recovered their vision. He adds that "on account of the almost uniformly brilliant results obtained and its comparative freedom from danger, it must be classed as a procedure that no rhinologist of the present can afford not to master."

With reasonable care, this semi-radical sphenoid operation should not be a dangerous one. It is of the greatest importance to work in a dry field. To try to keep one's bearings in a nose filled with blood and debris, is a foolish and unnecessary risk. There is no hurry. If the case warrants operation, it by all means, warrants a careful, painstaking technic. Dr. Harvey Cushing takes his time when he opens a brain or does a trans-sphenoidal pituitary. Every bleeding vessel is controlled so before he advances he has a perfectly dry field. Now, if Dr. Cushing, with his consummate skill and wonderful knowledge of the position of each structure reached, takes such infinite pains to obtain a good exposure and a dry field, it behoves us, as rhinologists with but limited ability, to be at least equally painstaking in whatever we attempt. The care he takes is most instructive, not only as he advances but as he finishes his operations, he, himself, drawing together, step by step, periosteum, muscle, fascia and skin, so that primary union is so perfect that one can scarcely detect the line of incision.

As to *anesthesia*, it is perfectly easy, in most cases, to do all that is necessary under local. A preliminary subene of scopolamine 1/100 and morphia 1/6 will wonderfully quiet most of the timid ones. A general anesthesia can, of course, be given if the operator so desires.

The *method of operating* and the instruments

used are largely matters of individual preference. Personally, I remove the middle turbinate, or as much of it as is necessary to gain access to the sphenoid, by incising it below and anteriorly with a Sluder knife, then severing its outer attachment with middle turbinate scissors, followed by snare, and finally removing all fragments, and occasionally, portions of the superior turbinate with biting forceps. It is especially important to freely expose the front wall of the sphenoid. Then the Sluder's sphenoid knife, with point downward, is passed along the cribriform plate until the front wall of the sphenoid is reached high up. Downward pressure easily forces the knife through this anterior wall. By this method, one is working away from the brain and never toward it. With two or three strokes downward and then two or three outward, the sphenoid is sufficiently opened to permit inserting an antero-posterior pair of biting forceps with which the anterior wall is quickly removed. The posterior ethmoid is uncapped with a curet. Don't meddle with the lining membrane of either the posterior ethmoid or sphenoid. Simply sop out the blood, preferably with absorbent cotton, and by no means pack the nose.

As to the fifth subdivision, *fatalities*, these will have to be considered on theoretical grounds as my operative cases have all survived.

In order to point out the special risks incident to nasal operations on cases with brain tumors, Dr. Harvey Cushing showed a case of meningitis at the last meeting of the New England L. & O. Society where death followed shortly after. The patient had an acoustic tumor, accompanied by marked hydrocephalus, which was not recognized as the cause of his failing sight, although he had been examined by several competent eye men and at least one neurologist. Several intranasal operations were performed without relief, and Dr. Cushing eventually saw him and removed the tumor.

In nearly all these brain cases, the increased intracranial pressure produces a thinning of the bones adjacent to the dura, and the accessory sinus walls are involved in this process, so that any operation, tending to weaken the support of the brain, is dangerous. The removal of the wall between the ethmoids and the nares, or even the breaking down of the cell partitions, would naturally weaken the

support somewhat, so that the dura might be forced into the nasal cavity, as happened, I understand, in this case, some months after the nasal operation.

Operations in the region of the cribriform plate are not entirely devoid of danger. They presuppose, on the part of the operator, an intimate knowledge of the anatomy and relationship of the structures. Unless one has had experience in opening the sinuses in cadavers, I do not think he really appreciates the size of these cells and the thinness of their walls. As previously intimated, the ethmoid exenteration (unless warranted by marked pathology) adds considerably to the dangers. It is here that the infection to the meninges probably originates, especially where these sinuses are not walled off from the dura. There is a certain element of danger in opening healthy sinuses, as post-operative infections not infrequently follow because one is never working in a sterile field. The traumatism incident to a complete ethmoid exenteration is more extensive than that by the minor procedure advocated, and the possibility of breaking through the cribriform infinitely greater. With the possible exception of the cavernous sinus and the optic nerve, there is no structure that is apt to be injured in opening the sphenoid and the mere uncapping of the posterior ethmoid. It has seemed to me, as I have learned of these fatalities, that they probably resulted from an unnecessarily radical procedure. Unless one is accustomed to work in the accessory sinuses, it would probably be better to remove the middle turbinate and let the sinuses alone, or do as I at one time advocated, a three-step operation:

First: Removal of the middle turbinate.

Second: Opening of the sphenoid.

Third: The posterior ethmoid.

This procedure offers the maximum of safety. The individual operations are so minor that there is but little reaction and all can be done quickly and under local anesthesia. But in cases where it is necessary to speedily relieve the engorgement about the nerve, this three-step procedure might not do this soon enough to prevent atrophy. This method may not appeal to the skilled operator, but for one unaccustomed to this type of intranasal work, it offers the maximum of safety, as doubtless many cases would improve by simply removing the middle turbinate, and it might not be necessary to open either the sphenoid or ethmoid.

That unnecessary fatalities may be prevented it is imperative that the operator should learn the proper technic, which he cannot do unless he works it out on cadavers. It is inexcusable for anyone to attempt this work unless thoroughly qualified.

The criticism has also been made that because certain rhinologists know how to do an exenteration of the ethmoids, they think they find sufficient evidence in these cases to warrant this operation. There is an element of truth in this accusation, I suspect, as it but too frequently happens that a specialist only sees what is within his own domain and has but little comprehension of the other great fields in medicine and surgery. It is, therefore, most urgent that he should familiarize himself with the work being accomplished in these other fields so that he may become an intelligent cooperator. He should be cognizant of all the other causes for loss of vision, and exercise his best possible powers of discrimination in arriving at the diagnosis. The safety of the patient, as well as the safety of the eye, require well balanced judgment. There is a time for action. There is a time for conservatism. When action is necessary, let not the life of the patient be needlessly imperilled.

A detailed report of the four following cases is appended, the numbers used representing a continuation of the cases previously published:

CASE 26. Mrs. N. W., aged 48, referred from the Eye Clinic of the Infirmary, May 12, 1920, by Dr. Ralph A. Hatch, with diagnosis of retrobulbar neuritis, right, of four days' duration, vision fingers over a small area on temporal side close to eye, large central scotoma. With the exception of severe headache about every two weeks, over frontal and temporal region, which she has had as long as she can remember, history revealed nothing important. She has not been especially subject to colds. The patient, on awaking, noticed that the eyesight in lower half of right eye was gone. This spread so that within 48 hours there only remained a small area of vision on the temporal side. On looking straight ahead, pain was experienced through the right temporal region. The eye was also sensitive to pressure. A month ago, patient had a severe cold, from which she has not entirely recovered. Nasal examination disclosed an enlarged and obstructive middle turbinate. The x-ray showed slight cloudiness of right ethmoids and sphenoid, which suggested thickened membrane. The fundus was practically normal. Neurologic, dental, physical and Wassermann, negative.

The usual operation under general anesthesia. Middle and superior turbinates found considerably hypertrophied, the latter obstructing drainage. The cell linings were red and thickened. No secretion was seen. The sections showed thickened basal membrane and a marked increase in the lymphocytes. The vision returned rather slowly. At the end of a week, fingers one foot in front of the eye; at the end of five weeks, 20/40 right and 20/50 left, which probably represented her previous vision. There was some pallor of the right nerve. On January 13th, i.e., eight months after the operation, Dr. Hatch reported v. o. d. 20/60+2 letters, and v. o. s. 20/40-2 letters; right nerve head shows pallor of temporal 2/3. There remains an oval opening in the sphenoid: nose free from crusts or secretion; headaches greatly relieved, both as to frequency and severity. The neurological tests given elsewhere in this paper were practically negative.

Case 27. E. C., a girl of 15 years, referred from the Perkins Institution for the Blind, on January 19, 1920, by Dr. W. F. O'Reilly, with diagnosis of double optic atrophy, following optic neuritis. His letter, which follows, gives an excellent history of the case:

"She came to me on July 16, 1916, with a history of five days ago having a blurring in the right eye and losing the sight of it shortly after. At that time, she had perception of fingers only. The nerve head showed a piling up, there was no detachment, no signs of hysteria. She had contraction of the visual field, especially down and out. Diagnosis, optic neuritis. Her left eye had normal vision and negative fundus findings. Her nose, to me, was negative. I could find absolutely nothing in the history to help me out etiologically, and referred her to Dr. Harvey Cushing. I believe she was taken into the Peter Bent Brigham Hospital, put through all the tests, general and local, and, as I recall it, in a conversation with Dr. Cushing, he told me he could find no causal factor in her case. Although I cannot say positively, I believe the sinuses were excluded. On this New Year's day, she came to me, and the minute I saw this 16-year-old girl amblyopic in both eyes, to say the least, I received a shock. My prognosis at the time, to the father, was that the other eye would not be affected. Of course I know that is not in keeping with the retrobulbar neuritis of other than nasal origin. She came this day because of some symptoms that the mother suspected of nasal obstruction and it was forcibly brought to my attention whether there was an obscure lesion in the nasal sinuses. It was not discerned by me or at the Brigham Hospital, or at the other institutions, or by the other men whom she saw after seeing me for the last time in 1916. I understand, during that time, she has been at the Carney Hospital and at the Boston City Hospital. During her stay at the latter, a

period of about two weeks, she became blind in the left eye."

At the Brigham Hospital, where she was a patient from July 23 to August 2, 1916, a diagnosis of retrobulbar neuritis was made. The following extracts are taken from the excellent record of this case:

"One week before admission, could see figures across the street, but on admission could only distinguish between light and darkness in the right eye. Had daily headaches about right eye and may have had a slight cold. Previous to this, never had any pain over her sinuses. Pupils—Right larger than left, each round, regular and reacting to light. Nose—Shows no external deformity or obstruction to breathing. Roentgen report showed negative findings. The fundi: o.d.—Disc hyperemic and injected with vessels engorged and tortuous. Nasal margin of disc obscured. Optic cup and lamina not visible because of edema. No measurable elevation. Periphery clear: o. s.—Picture not so marked as in o.d., but otherwise the same. Nasal margins not hazy. A complete neurological examination is entirely negative, with exception of fundi. No involvement of any other cranial nerves. No cerebral or cerebellar signs. Reflexes normal."

A note by another examiner was as follows: "v.o.s. 20/20; v.o.d. 20/20; o.d.—Optic nerve inflamed. Interstitial elevation of disc above margins which are not elevated, but slightly edematous. Optic cup has become a hillock, with increase of fine vessels and injection. Same condition o.s., but much less marked."

The Wassermann reaction was negative. On discharge, 10 days after admission, the note made was as follows:

"The optic neuritis is the only neurological condition found at the present time. Her condition did not change in any respect during her time at the hospital. Advised to return for observation after 1-2 months, or sooner if any further symptom developed."

The sight of the right eye never returned, and within a short time she lost even light perception. About nine months later, this girl was a patient at the Neurological Department of the Boston City Hospital (from March 9 to 21, 1917), where a diagnosis of double primary optic atrophy was made. The x-ray of the sella turcica was negative. An important symptom was noted, that the patient had pain in the left eye and some headache which came on with the loss of vision and persisted while she was at the hospital. A note was also made that the sight had gradually failed while there and that when discharged the outline of only large objects were distinguishable. The left disc was blurry in appearance. All tests, physical and neurological, were negative. No note was made as to the nose or the accessory sinuses, and no fields attempted. This poor child left the hospital practically blind. What little vision she

had in her left eye faded away, so that at present even light perception is doubtful. At neither institution was any attempt made to relieve the optic neuritis by draining the accessory sinuses, and the neuritis was shortly followed by optic atrophy.

As the doctor referring her said, the patient was complaining of some blocking of the nose, and, to quote from his letter again:

"In view of what you have written and because I have seen cases which have brought your observation forcibly to my notice, I thought from the moral side, if from no other, you should see the case. Unquestionably, she now has optic atrophy in both eyes and, of course, according to what you and I know, the case is beyond hope, nevertheless, there are some things that up to the last few years we have not known, and I feel, from the circumstances that I have detailed above, that you should see the case."

I noted a slight deflection of the septum to the left, which extended far back, crowding somewhat the large unhealthy middle turbinate on that side. The right middle turbinate was also enlarged, soft to the touch, and about it there was considerable secretion. Both middle turbinates, without doubt, obstructed the posterior sinuses. One cannot tell how much change had taken place in these turbinates in the three years since the trouble started. Very probably there was some obstruction at that time, even if not detected. The patient was again seen on January 12, 1921, and the following notes made:

"Has been well, with only a slight cold, after which there is always a good deal of secretion, from which, as a matter of fact, she is never entirely free. Has pain in head at times, but the ache is always in the eyes." Dr. Ralph A. Hatch examined the eyes and reported: "A case of optic neuritis followed by atrophy: right pupil larger than left and does not react to light; left pupil, slight reaction. Vision—right eye $20/200$; vision left eye, light perception doubtful. Both nerve heads perfectly white; arteries small; disc margins clearly defined." That I might verify my own findings, I asked Dr. John H. Blodgett to examine the nose, and he reported: "Left middle turbinate is abnormal in size, unhealthy color, and superior portion of nose unusually narrow, giving the impression that there was considerable pressure and blocking to the ethmoidal labyrinth. The right middle turbinate, anterior end, seems broader and thicker than left, and presses against the septum. Impossible to get a small applicator between septum and anterior end of turbinate. There is extreme pressure by both middle turbinates against the outer wall and very little opportunity for drainage of any secretion that might be dammed up in the ethmoidal labyrinth or sphenoid." As he saw the

nose after two hours' cocaineization, it was most favorable for examination.

Before dismissing this case, let me quote the following:

In PAUL ROEMER's Text Book of Ophthalmology, in speaking of the etiology of optic neuritis, the writer says:

"The question whether a disease of the accessory sinuses is present, especially of the posterior ethmoidal cells or of the sphenoidal sinus, is very important. The optic neuritis caused in this way may affect either one or both eyes. Frequently the trouble begins with an acute disturbance of vision, usually a central scotoma, after which the neuritis appears. When we can find no *plausible and satisfactory* explanation of an optic neuritis, the *accessory sinuses must be carefully examined*, for in *many cases immediate* operative treatment can save a part of the vision."

Let me also quote from Dr. SCHWEINITZ on "Diseases of the Eye," 8th Edition, page 475:

"The prognosis of optic neuritis depends upon the cause and the duration of the process. If the focus of disease, for instance, in the accessory sinuses can be removed, vision may be saved and edema and inflammation will subside. *Untreated optic neuritis almost always produces blindness.*"

CASE 28. Miss L. W., aged 26, referred by Dr. Henry Hawkins on June 23, 1920, to determine cause of severe pain extending from the frontal to the occipital region. She was in poor health, having been under the care of Dr. Robert Souter for four years, for injury to the spine which was followed by a low grade tubercular infection. The appendix has been removed, and for some years there has been albumen and casts in the urine. She gave a history of always having had pain in the back of her head. Three months ago, following a severe cold, her eyes were blurry for two or three days, and sensitive on pressure or movement. Nasal examination revealed marked deflection of the septum to the right, but the turbinates did not appear especially hypertrophied or obstructive, and no evidence of accessory sinus involvement could be detected. The vision not being affected at this time and nothing found in the nose to account for the headaches, the patient was not seen again until October 6, 1920, when she gave a history of having had a second attack of retrobulbar neuritis during my vacation. This was preceded with increased pain through the eyes and discomfort on movement, vision 20/200 right. The fundus was normal in appearance. There was a central scotoma. X-ray and Wassermann both negative. She was a patient at the Massachusetts Charitable Eye and Ear Infirmary 11 days, and was about to be operated upon when the vision commenced to improve, and when I saw her, was about normal. There has been one or two periods of slight blurriness since then.

Were she in good physical condition, it would be advisable to correct, at least, the septal deformity; but as her history and the dullness at the apex of the right lung found on examination at the Massachusetts General Hospital, suggest the possibility of tuberculosis, it was deemed safer to adopt local treatment and general medication. Under these she has slowly improved.

CASE 29. Mrs. M. M., aged 26, a patient of Dr. W. Holbrook Lowell, was seen at the Massachusetts Charitable Eye and Ear Infirmary on January 12, 1921. Diagnosis—Acute retrobulbar neuritis, right, vision 20/200. History of pain—sensitivity and blurriness of right eye for past ten days. There was a sensation of lameness when the eye was moved up or down. Fundus, negative. No evidence of optic neuritis. The nasal examination revealed septum in median line and inflamed middle turbinates. They shrunk, however, under cocaine, to the normal size and as they did not seem to be especially obstructive, the prediction was made that recovery would probably take place without operation. The x-ray showed slight blurriness of the ethmoids. The medical, dental, neurological and Wassermann were negative. On January 29th, the eye was found to be improving slowly—vision 20/40. The Peter Bent Brigham Hospital examination was negative. The right middle turbinate hung free from the septum and appeared of normal size and but slightly, if at all, obstructive. On February 8th, Dr. Lowell reported vision 20/30+. There did not seem to be enough obstruction to the posterior sinuses to warrant the removal of the middle turbinate. Should there be recurrences, this would be indicated. This is a case for observation and represents the type where spontaneous recovery may be anticipated.

SUMMARY

I. A careful differential diagnosis should be made in every case, but in the sub-acute or chronic forms, it is of the utmost importance to rule out central lesions and toxic infections.

II. While a certain proportion of cases recover, either spontaneously or under treatment, permanent blindness may result in others unless they receive prompt surgical interference. The size and position of the middle and superior turbinates determine largely the question of recovery with or without operation, and when found to be blocking the ventilation to the posterior sinuses, they should be removed.

III. The opening of the accessory sinuses for sudden loss of vision, after the exclusion of other causes, has been advocated by many investigators, even with negative nasal findings. The fact that nothing is found either on inspect-

ing the nose or by roentgenograms, does not prove that there is no infection in the nose. It simply means that it cannot be detected. If the loss of vision is due to the accessory sinuses, there is pathology, but it may be located so far within the nose as to escape detection. As the inflammation incident to this infection is frequently of the exudative but non-suppurative type, the roentgenograms are practically negative. A more careful timing of the plates has shown a slight cloudiness in some, so there is hope that this bugbear of negative nasal findings will soon be eliminated.

IV. The complete ethmoid exenteration is not only unnecessary but actually contraindicated, unless there is a sufficient pathology in the ethmoid labyrinth to warrant it, irrespective of the loss of vision. The semi-radical sphenoid procedure which is advocated is one practically devoid of danger, and can be performed under local anesthesia. It, in no way, impairs the function of the nose or needlessly imperils the life of the patient. It sufficiently ventilates and drains the regions adjacent to the optic nerve. Should, however, the visual disturbance be due to toxemia from some other sinus, or from teeth or tonsils, these foci of infection should receive attention.

V. While it is well to emphasize the dangers of this or any operation in the hands of the unskilled, the fact is, this sphenoid operation is frequently performed for much less serious complaints than loss of vision.

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A RARE FRACTURE OF THE LOWER
END OF THE HUMERUS.

BY LUTHER G. PAUL, M.D., F.A.C.S., BOSTON.

No mention of the fracture described below has been found, after a moderately thorough search of the literature.

A girl, 14 years of age, was referred to me by Dr. M. F. Cronin of Boston, on April 30, 1919. The day before, she had fallen down several steps while carrying a younger child.

The left elbow was swollen and tender over the external part, and motion was much restricted on account of pain. There was a slight bruise of the skin just above and back of the head of the radius. She had about twenty degrees of flexion, and about the same degree of extension, without pain. The rotation was about one half normal. Ether was given, and after manipulating the part, I was unable to make a diagnosis of the condition. The bony landmarks were in normal relation, and there was no abnormal mobility or crepitus noticed. The arm was put in a comfortable position, which was nearly right angle flexion, and on the next day, an x-ray was taken.

This showed a vertical fracture of the lower end of the humerus, in which the anterior part of the articulating surface had been separated from the rest of the bone, and that this fragment had been forced out of the joint, and was lying on the anterior surface of the lower end of the humerus, fully an inch above its normal position.

Under ether, an unsuccessful attempt was made to reduce the fracture, and on May 9, 1919, she was again etherized, and an incision into the joint was made on the outer side of the elbow. The fragment was found as the x-ray



BEFORE REDUCTION.



AFTER OPERATION.

showed. It was freely movable, and its only point of attachment was by its inner end to a small area of the capsular ligament. The fragment was so loose that it could be almost wholly delivered from the wound, and with retraction of the anterior soft parts, could be plainly seen. It was seen to consist of the capitellum and trochlear surfaces in one piece.

All attempts to replace the fragment were without success, until the following method was tried. The forefinger was placed in the wound over the fragment, and between the fragment and the tendons of the biceps and brachialis anticus muscles, the elbow being flexed to somewhat beyond a right angle. The assistant then extended the forearm, and at the same time exerted a pull to increase the space between the humerus and the upper ends of the radius and ulna. The pressure exerted by the tightened muscles on the finger of the wound was surprisingly powerful, and when to this was added pressure on the outside, the fragment slipped into place.

The arm was put in acute flexion, and the capsule closed with No. 1 chromic catgut, and the skin with silkworm gut. The arm was held in acute flexion with adhesive plaster. There was considerable swelling in twenty-four hours, so that it was necessary to extend the arm a few degrees in order to relieve the circulation.

The wound healed well, the stitches being removed on the ninth day. The adhesive plaster was omitted at the end of three weeks, and at that time, extension was twenty degrees less than a right angle, and flexion was normal. An x-ray at this time showed the fragment in its normal relation. She was given massage and passive motion, and instructed to carry moderate weights, such as a school bag with books in it. The amount of extension gradually increased, and on September 24, 1919, the extension was fifty degrees beyond a right angle, and normal flexion. Three months later, the movements of the joint were normal. The accompanying x-ray photographs show the fracture before and after reduction, and need no detailed description.

RECONSTRUCTION OF EARS

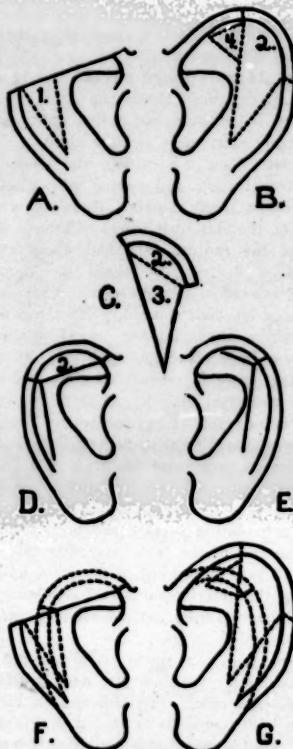
BY HILBERT F. DAY, M.D., F.A.C.S., BOSTON.

It is rare that we are asked to multiply ears, but that was the proposition that was put up to me.

I was asked to replace the lost portion of an ear and by plastic surgery I succeeded in making two perfect ears from one and a half ears.

On the afternoon of January 30, 1920, I had referred to me by Dr. Henry J. Perry, a young man, D. B. C., 22 years old, who stated that twelve days before he had injured one of his ears by glass in a taxicab accident. The upper portion of his ear was cut immediately off in a straight line which sloped downwards and backwards, as is shown in Figure A.

On examination, it was found that the cut edge was nearly healed and various methods of procedure were considered which would close the defect. The possibilities of flaps, either from the head or some other portion of the body, were considered. To my mind, none of these schemes would do more than cover in



the raw edge, as they would not stand up, having no cartilage, and would give the appearance of a floppy or deformed ear.

I told the young man that if he was willing to take a chance, I would attempt to graft a portion of his good ear into the defective ear and that I could promise him that his ear would heal properly and would be a well formed ear, and that if the grafting did not take, his deformed ear would have less area to be closed in. He was willing to take this chance, and therefore, on February 2, 1920, he submitted to an operation at the Elliot Hospital, Boston, which I can best describe by following the accompanying diagrams.

Operation. Assistant, Dr. George H. Binney to whom I am gratefully indebted for the diagrams. Ether anesthesia. Dr. William F. Temple.

Both ears were scrupulously cleaned with soap and water, alcohol, ether and iodine. The cut edge of the deformed ear was then freshened. Triangle No. 1 was then removed and the edges of the wound caused by its removal were carefully approximated. (All sutures used in this operation were interrupted horsehair sutures to the skin only. In no place was the cartilage touched by a suture and no bleeders were tied.)

The next step was the removal of a piece of the good ear, shown by No. 2 in Diagram B. Haemostats were applied to bleeding vessels in ear B and the ear wrapped in a moist sponge and left for later attention.

The piece of ear which comprised a portion of the fold of the ear, cartilage and skin, was then trimmed down so as to fill in this defect in the mutilated ear, as shown by Diagram C, and was then sewed into place, leaving the deformed ear as per Diagram D. This, of course, reversed the direction of the fold of the ear, as will be noticed if the diagram is followed through. The repaired ear was then wrapped in gauze wet with hot salt solution.

We then returned to what might be called the donor ear. It was found necessary to cut another wedge of cartilage and skin from it, in order to drop the fold above so that it would meet the fold below. This wedge, or triangle of tissue, is numbered 4 in Diagram B. All cut edges were then carefully approximated with sutures, as before described, giving as a result, an ear corresponding to Diagram E, which equalled in size and appearance the repaired

ear, as shown in Diagram D. No dressings were applied to either ear.

(Diagrams F and G show all steps of the process described above and gives a chance for a comparison of the preoperative and post-operative shape of the ears. They show that the ears were reduced from rather abnormally large ears to those of normal size.)

The patient was returned to the ward and it was then noted that the transplant added to the deformed ear was perfectly white and anaemic. The nurses were instructed to change constantly, hot saline applications for the first 24 hours. At the end of that time, a slight bluish tinge could be seen in the skin of the graft, which changed rapidly during the next day to a pink, and finally assumed a normal color.

The sutures were removed partially on the fifth day and the rest on the seventh day, and the patient was discharged and passed out from observation a month later. At that time, he had two ears which looked absolutely alike. He had perfect circulation in the graft, and the fold of the repaired ear stood up as firmly as that of the normal ear. There was no overlapping of cartilage. Apparently the cartilage had healed as firmly as did the skin edges.

The patient said that he liked his new ears better than his original ones.

ONE THOUSAND CASES OF GENERAL ANESTHESIA. SOME OBSERVATIONS AND CONCLUSIONS.

BY WILLIAM T. BAILEY, M.D., BOSTON.

In this series, operations on the nose, throat, ear, mouth, face and eyes, comprised 60% of the total of the cases involved and to which reference will first be made.

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Maintenance of anesthesia was by ether

showed. It was freely movable, and its only point of attachment was by its inner end to a small area of the capsular ligament. The fragment was so loose that it could be almost wholly delivered from the wound, and with retraction of the anterior soft parts, could be plainly seen. It was seen to consist of the capitellum and trochlear surfaces in one piece.

All attempts to replace the fragment were without success, until the following method was tried. The forefinger was placed in the wound over the fragment, and between the fragment and the tendons of the biceps and brachialis anticus muscles, the elbow being flexed to somewhat beyond a right angle. The assistant then extended the forearm, and at the same time exerted a pull to increase the space between the humerus and the upper ends of the radius and ulna. The pressure exerted by the tightened muscles on the finger of the wound was surprisingly powerful, and when to this was added pressure on the outside, the fragment slipped into place.

The arm was put in acute flexion, and the capsule closed with No. 1 chromic catgut, and the skin with silkworm gut. The arm was held in acute flexion with adhesive plaster. There was considerable swelling in twenty-four hours, so that it was necessary to extend the arm a few degrees in order to relieve the circulation.

The wound healed well, the stitches being removed on the ninth day. The adhesive plaster was omitted at the end of three weeks, and at that time, extension was twenty degrees less than a right angle, and flexion was normal. An x-ray at this time showed the fragment in its normal relation. She was given massage and passive motion, and instructed to carry moderate weights, such as a school bag with books in it. The amount of extension gradually increased, and on September 24, 1919, the extension was fifty degrees beyond a right angle, and normal flexion. Three months later, the movements of the joint were normal. The accompanying x-ray photographs show the fracture before and after reduction, and need no detailed description.

RECONSTRUCTION OF EARS

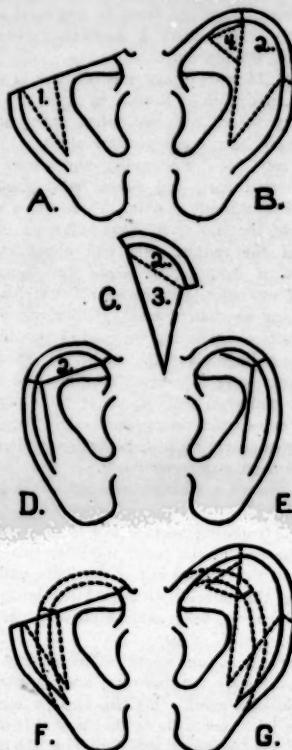
BY HILBERT F. DAY, M.D., F.A.C.S., BOSTON.

It is rare that we are asked to multiply ears, but that was the proposition that was put up to me.

I was asked to replace the lost portion of an ear and by plastic surgery I succeeded in making two perfect ears from one and a half ears.

On the afternoon of January 30, 1920, I had referred to me by Dr. Henry J. Perry, a young man, D. B. C., 22 years old, who stated that twelve days before he had injured one of his ears by glass in a taxicab accident. The upper portion of his ear was cut immediately off in a straight line which sloped downwards and backwards, as is shown in Figure A.

On examination, it was found that the cut edge was nearly healed and various methods of procedure were considered which would close the defect. The possibilities of flaps, either from the head or some other portion of the body, were considered. To my mind, none of these schemes would do more than cover in



the raw edge, as they would not stand up, having no cartilage, and would give the appearance of a floppy or deformed ear.

I told the young man that if he was willing to take a chance, I would attempt to graft a portion of his good ear into the defective ear and that I could promise him that his ear would heal properly and would be a well formed ear, and that if the grafting did not take, his deformed ear would have less area to be closed in. He was willing to take this chance, and therefore, on February 2, 1920, he submitted to an operation at the Eliot Hospital, Boston, which I can best describe by following the accompanying diagrams.

Operation. Assistant, Dr. George H. Binney to whom I am gratefully indebted for the diagrams. Ether anesthesia. Dr. William F. Temple.

Both ears were scrupulously cleaned with soap and water, alcohol, ether and iodine. The cut edge of the deformed ear was then freshened. Triangle No. 1 was then removed and the edges of the wound caused by its removal were carefully approximated. (All sutures used in this operation were interrupted horsehair sutures to the skin only. In no place was the cartilage touched by a suture and no bleeders were tied.)

The next step was the removal of a piece of the good ear, shown by No. 2 in Diagram B. Haemostats were applied to bleeding vessels in ear B and the ear wrapped in a moist sponge and left for later attention.

The piece of ear which comprised a portion of the fold of the ear, cartilage and skin, was then trimmed down so as to fill in this defect in the mutilated ear, as shown by Diagram C, and was then sewed into place, leaving the deformed ear as per Diagram D. This, of course, reversed the direction of the fold of the ear, as will be noticed if the diagram is followed through. The repaired ear was then wrapped in gauze wet with hot salt solution.

We then returned to what might be called the donor ear. It was found necessary to cut another wedge of cartilage and skin from it, in order to drop the fold above so that it would meet the fold below. This wedge, or triangle of tissue, is numbered 4 in Diagram B. All cut edges were then carefully approximated with sutures, as before described, giving as a result, an ear corresponding to Diagram E, which equalled in size and appearance the repaired

ear, as shown in Diagram D. No dressings were applied to either ear.

(Diagrams F and G show all steps of the process described above and gives a chance for a comparison of the preoperative and post-operative shape of the ears. They show that the ears were reduced from rather abnormally large ears to those of normal size.)

The patient was returned to the ward and it was then noted that the transplant added to the deformed ear was perfectly white and anaemic. The nurses were instructed to change constantly, hot saline applications for the first 24 hours. At the end of that time, a slight bluish tinge could be seen in the skin of the graft, which changed rapidly during the next day to a pink, and finally assumed a normal color.

The sutures were removed partially on the fifth day and the rest on the seventh day, and the patient was discharged and passed out from observation a month later. At that time, he had two ears which looked absolutely alike. He had perfect circulation in the graft, and the fold of the repaired ear stood up as firmly as that of the normal ear. There was no overlapping of cartilage. Apparently the cartilage had healed as firmly as did the skin edges.

The patient said that he liked his new ears better than his original ones.

ONE THOUSAND CASES OF GENERAL ANESTHESIA. SOME OBSERVATIONS AND CONCLUSIONS.

BY WILLIAM T. BAILEY, M.D., BOSTON.

In this series, operations on the nose, throat, ear, mouth, face and eyes, comprised 60% of the total of the cases involved and to which reference will first be made.

Preliminary medication of morphia, 1/6-1/4, and atropine, 1/200-1/150, a half hour previous to operation, was given in 80% of these cases, none being given under 15 years of age, as a general rule.

Gas-oxygen induction was used in practically all cases from five years of age and upward,—over 90%, otherwise by the open drop "B. C. H." mask method. Except in the case of small children and in those operations requiring the use of the operating table, induction and maintenance took place with the patient sitting in the operating chair.

Maintenance of anesthesia was by ether vapor

insufflation,—75%,—gas-oxygen alone being found practicable in only a small proportion of cases, chiefly dental. Ether vapor was delivered by means of a catheter through the nostril, by mouth hook, tongue depressor airway, or by an adjustable mouth gag tongue depressor, the vapor being delivered through a tube attached to the upper surface of the depressor, at the base of the tongue.

This latter instrument devised for tonsil operations, finds great favor with some, but is rejected by other operators. From the anesthetist's standpoint, it is an excellent instrument, for when properly applied and used, there is afforded a sufficient airway and breathing space. Anesthesia can be properly maintained, in place of the asphyxia which so frequently occurs, especially as the result of inefficient handling of the ordinary tongue depressor by an assistant or nurse, while more space and a better vision is obtained and less assistance is required by the operator.

In all operations in this series below the level of the epiglottis, intra-pharyngeal insufflation was found sufficient for satisfactory anesthesia and operative work.

For producing ether vapor the ordinary foot bellows arrangement was commonly used, but a portable electric blower devised by the writer, practically noiseless, gave great satisfaction and proved of great value, in that a steady and constant flow of a known volume of ether vapor could be maintained indefinitely. The volume is easily regulated by a rheostat and in addition a blowoff gauge set at the pressure desired may be used as a matter of safety. This machine has been used in other than nose and throat cases, as in abdominal operations, and found most satisfactory in that it is possible to keep that steady and even maintenance so necessary for satisfactory anesthesia. It is necessary that the ether container be kept in a hot water bath at a constant temperature, by an electric heating arrangement, otherwise there will be a detrimental variation in the concentration of vapor.

As stated above, morphia and atropine as a preliminary medication, was used in the great majority of cases and so far as this series is concerned, the writer is convinced of their value as a routine measure to be adopted in all but exceptional cases. Induction is simplified, the amount of ether required for maintenance markedly reduced, shock possibilities greatly

diminished, and the necessity for post-operative doses of morphia for control of pain and restlessness largely done away with. In tonsillectomies, it was noted that there appeared to be a tendency for the blood and mucus combination in the mouth and pharynx to be moreropy and tenacious following the use of atropine than was the case when it was omitted.

In dental cases, gas oxygen alone was usually found to be sufficient except in bad cases of impaction, etc., when the addition of ether vapor was found necessary for satisfactory work. In induction and maintenance was generally by means of a close fitting nosepiece and under forced pressure. In certain operations, other than dental, on the face, nose and eyes, a very satisfactory anesthesia was maintained under gas oxygen alone, for indefinite periods, the longest lasting for an hour and fifty minutes, by means of the ordinary face mask or by a mouth tube and rubber dam combination.

The Gwathmey apparatus has been used principally, the writer preferring this for the reason that visual evidence of the flow of the gases is possible at any time during its use, believing that the condition of the patient is the governing and controlling index to be considered, rather than theoretical or mechanical provisions.

Leaving now, especial consideration of head cases, ether only was used for induction in about 10% of the total number of cases, the open drop "B. C. H." mask method being used, and the records show an absence of excitement and unpleasant features favorably comparable to the use of the gas-ether sequence, except as to length of time required in obtaining a surgical anesthesia.

During the primary stages of anesthesia, the excitement and struggling, whenever it may occur, would appear to be due to one or several causes,—faulty administration, alcoholic history, mental condition and idiosyncrasy. Once having lost consciousness, women give far less trouble and concern than men, and require less ether for maintenance. Patients with an alcoholic history specially, and the very large and heavy type in men, require much larger preliminary doses of morphia than do ordinary normal cases. In using the gas-oxygen-ether sequence, care should be used to see that the patient is as deeply under as is possible with the nitrous oxide, before attempting to use ether and at the same time not to use it in too concentrated

amounts. Otherwise, laryngeal spasm will surely occur and trouble and delay follow.

Eminently satisfactory was a corroboration of the fact that, surgical anesthesia having been obtained, maintenance should be governed principally by the eye reflexes, respiratory conditions and character of the pulse. Close and constant attention to these items will give to the anesthetist a most dependable index in carrying the patient as he should be carried, on a steady and even level of anesthesia, and the *lightest* allowable by the character of the operation,—a fact of supreme importance so far as the welfare of the patient is concerned, but which, unfortunately, many operators fail to fully appreciate, even in these times.

When necessary, the use of a metal mouth air-way or even a soft rubber nasal tube, will in most cases afford a proper respiratory passage way, thus avoiding the tiresome lower jaw protrusion and other efforts by the anesthetist so frequently called for by a tongue obstructed pharynx.

With reference to post-operative nausea and vomiting, it would appear as a result of observation in this series, that it occurs in a more or less direct proportion to the depth of the anesthesia under which the patient was carried during the operation. The greater the amount of ether absorbed, the longer the time necessary for its elimination, and for the same reason the increasing amount of damage possible and probable to the lungs and kidneys. As to the theory that post-operative nausea and vomiting are due in part to the preliminary use of morphia, it was noted that this condition was present as frequently in its absence as in its use, the conclusion being that this argument against the use of a preliminary dose of morphia is without a majority basis of facts, cases of known idiosyncrasy to the drug being excluded.

In this series there were no post-operative pneumonias, and no deaths traceable directly to the anesthetic. One case was postponed on account of an acute heart lesion, but none were refused on account of heart murmurs or only partially compensated heart affections. High blood pressure did not deter,—as high as 240 was recorded,—unless a serious condition of the kidneys was present. So far as could be obtained, no information was received of cases of acidosis following anesthesia, due probably to the fact that it is customary nowadays to anticipate such

possibilities by thorough examinations previous to operations, and by a selected preliminary diet and medication.

As one result of his observations following a rather extensive and varied experience in various private hospitals, the writer feels that it would not be out of place to call attention here to the conditions which sometimes exist in the operating and adjacent rooms of some of these institutions during the time that a patient may be present as the unfortunate victim of circumstances.

To a majority of people, the prospect of going to a hospital for an operation is unpleasant, not to say frightful. The sensation is not lessened, if by force of circumstances the patient shortly before time set for operation is taken directly to the operating room, there to go under the anesthetic, instead of to a separate anesthetizing room. In the few minutes of more or less delay which occurs at this period, the patient has an opportunity for taking in and mentally indelibly registering all of the "horrors of war" of which he and especially *she* is about to be the victim.

Chance remarks by doctors and nurses, noise and confusion incident to preparation for the operation add to the sensations, and last but not least to be considered, is the greatly increased difficulty for the anesthetist in securing for the patient a pleasant, rapid and uncomplicated induction. For be it remembered, that to the vast majority of people, it is not so much the operation itself that is feared, as is the prospect of the trip to the operating room and the taking of and the going to sleep under the anesthetic,—with the fear that they may never awake, once having become unconscious from its influence. The writer feels that the operating surgeons increase in practice and financial emoluments, while dependent upon his success as an operator principally, yet is dependent to a far greater extent than is appreciated, upon the patient's mental impressions received during the few minutes of consciousness obtaining while on the operating room floor, and on the way in which the anesthesia is handled by the anesthetist, trained or otherwise.

Depending upon the favorable or unfavorable impressions received and upon the conditions surrounding her, the patient will become an enthusiastic advertiser and supporter of the surgeon and the hospital, or on the contrary,

may become an agent for the dissemination of stories and exaggerations with reference to hospitals and doctors, resulting in injury to the profession, loss of practice for the surgeon, and a gain in the ranks of the followers of the teachings of one Mary Baker Eddy of uncertain but rising fame,—a deplorable result, but avoidable if more attention were paid to the details referred to above.

The writer feels that far too little attention is given to the psychological aspect of the situation as viewed from the patient's standpoint. There is field for improvement in conditions affecting this situation which would materially affect the attitude of the public at large and prospective patients in particular, with reference to proposals or recommendations for surgical operations at hospitals or elsewhere.

GENERAL SUMMARY.

Every case coming to an operation under general anesthesia, should have a careful urinary examination and test for presence of acidosis, as well as of the heart and lungs, while the preliminary use of morphia and atropine an hour more or less preceding the operation, should be made a routine measure unless contraindicated in exceptional cases.

Induction by the gas-oxygen-ether sequence should be the method of choice, while maintenance, whether by vapor insufflation, open drop or rebreathing methods, should be on a steady level with a carefully regulated vapor concentration and under the lightest anesthesia allowable by the character of the operation.

Gas-oxygen used alone, in connection with morphia and scopolamine, one or both, in the hands of an expert, is sufficient for many major and most minor operations, but the apparatus should be fitted or provided with an arrangement for the instant admission of ether vapor when circumstances require a deeper anesthesia.

The disagreeable conditions and unpleasant features which so often follow an operation and the complications which may arise may be largely avoided or at least greatly modified and diminished by the skill exhibited by the anesthetist during the maintenance period of the operation. In other words, a successful outcome is largely, if not at times chiefly, dependent upon the depth of the anesthesia—the lightest allowable by the operation, the evenness of maintenance and the quality of the concentration of the ether vapor inhaled by the patient.

in connection with close and constant attention to the respiration and pulse and to the condition of the eye and lid reflexes.

Occasional deaths on the table, as well as post-operative deaths, nausea and vomiting, shock and delayed convalescence are due in a large number of cases to the ignorance and lack of skill and proper training of the doctors and nurses who so frequently insist or are called upon to give an anesthetic in the absence of the specialist.

Anesthesia and asphyxia are not synonymous terms, as one might infer from observation of the work, methods and results of most of these well intentioned, but, should avoidable accidents or events occur, criminally responsible people. Except in emergencies, the anesthetic should be handled only by the expert in its use, and the experts or those seeking to qualify as such, should be limited to those only who are in possession of a medical degree and a license for the practice of medicine and surgery from the proper authorities. During an operation the life and welfare of the patient is relatively as much in control of and dependent upon the skill and knowledge of the anesthetist, as it is upon that of the operator. The operator and the anesthetist have an equal liability and responsibility morally, if not legally. The patient or the family have the right to, and should therefore, demand that the anesthetist be a specialist corresponding in skill to that of the surgeon into whose hands the patient has been placed, for the saving or preservation of his or her life, future welfare, comfort and happiness.

SIGNIFICANT REACTIONS OF THE ARTERIAL TENSION. MANIFESTATIONS OF THE ANGIO-KINETIC ENERGY CLINICALLY OBSERVED AND INTERPRETED.*

(Concluded from page 321.)
BY CLAES JULIUS ENERUSKE, BOSTON.

SECOND PART.

IX. ANGIO-KINETIC HETERO-LATERAL ATAXIA. VASOMOTOR DISSOCIATION AND ASYMMETRY.

In cases possessing spontaneously stable vaso-tonus at normal tension level, the measurement of the *radialis maximum* gives equal values on right and left arm, save rare exceptions with special cause. At least the *basic radialis maximum* value is the same, even if the

* Received October 28, 1920, for publication.

tests *c* and *d* may show some difference on the opposite sides (compare case No. 55, Table III). In cases of unstable vasotonus at variable tension levels, on the contrary, and more particularly in cases in which pressor-reactions predominate and high tension levels are frequent, it appears that the symmetry of the expenditure of angio-kinetic energy is not rarely disturbed to such extent that different tension values prevail in the two halves of the body. As the measurements are made only on the arm, the testimony of direct observation gives information only concerning the state of arterial tension in the arm, but there is experimental evidence in the physiological literature in regard to blood pressure in animals to justify the assumption that the state of arterial tension in the upper extremity reflects a corresponding condition in arteries of similar calibre in the lower extremity and in the head.

"Electric excitation of any afferent point (of animal) may produce reflex-reaction of the blood pressure even in regions most remote from the point of afferent stimulation. Electric excitation of any afferent in animal, produces blood pressure reflex-reaction first in the upper extremity, thereafter in the lower extremity, where the reaction is more persistent. Electric excitation of afferent in animal on one side of the body produces blood pressure reflex-reaction in the opposite half of the body (1-15)."

Compare the author's clinical observation of crossed reflexes due to mechanical excitation on opposite side of the body, column *f*, Table III.

In Table III comparative values of right and left *radialis maximum tension* are represented. The observations have been made in the following order: first, test *a* on right arm, thereafter same test on left arm; then right test *b*, left test *b*, and so on until right test *d* is made; thereafter no afferent stimulus is applied upon left arm, but *radialis maximum reaction* upon left arm, due to afferent stimulus applied upon right ulnar nerve, is measured immediately after the right test *d* value is recorded. Thus the values upon Table III, left arm *d*, represent crossed vascular reflex reactions from afferent stimulus upon the opposite side of the body. That is the reason why the liability indices of left arm, column *f*, are of lesser magnitude than right arm liability indices, column *e*, which latter are due to afferent stimulus upon the same side as the reaction observed. The author has, consequently, produced, through clinical

diagnostic test, direct evidence proving the almost constant transmission of vascular reflex-reaction to arteries of opposite half of the body. But just as the consensual pupil-light reflex is of smaller magnitude than the direct one, so the crossed arterial pressor or depressor reaction is of smaller magnitude than the direct reflex from afferent stimulus on same side, save exceptions with special cause which is comprehensible but cannot be discussed in this connection.

The cases Nos. 36-40, in Table III, give examples of the symmetric expenditure of angio-kinetic energy, even in the cases in which there is much disturbance in the regulation and co-ordination of compensatory pressor and depressor influences, resulting in anomalous *radialis maximum tension* values at high levels.

In cases Nos. 48-54, on the contrary, examples present themselves of profound disturbance in the symmetric disposal of the angio-kinetic energy, resulting in dissociation of the vasomotor activity of the two halves of the body, super-added to the disturbance in the regulation and co-ordination of compensatory pressor and depressor-influences and reactions which result in the anomalous levels of the *radialis maximum*. This will, undoubtedly, seem surprising in view of the "functional" character of the diseases. The causes of these phenomena will be considered in one of the remaining chapters.

Even counting out the cases in which these symptoms are relieved more or less by such treatment as ordinarily suggests itself, it remains a fact that vasomotor dissociation of this nature appears to be very frequent in the hysterias, neurasthenias, paraesthesia, palsies, and various "spells" of the menopause, and also in similar variable complaints in middle-aged men.

Less surprising is the asymmetry of vasotonus found in cases Nos. 41-47.

In physiological literature, asymmetry of the blood pressure is, in animals, assumed to be due to different degrees of permeability of the nerve paths in unequally exercised limbs, or to (possibly) different sensory excitability in the two halves of the body and in the two corresponding sides of the brain.

Clinical examination determines the cause in each individual case. As examples: In Table III, is a case, No. 41, left hemiplegia (post-apoplectic) with tension 50 m.m. lesser on affected side, yet hypertonic (basic value 180 m.m.). When the fact is duly considered that

the vaso constrictor fibres (and probably the vasodilators), departing from their origin (Ludwig-Thiry's centre) in the upper part of the bulb run mostly together with the skeletal motor fibres in the lateral bundles of the cord, leaving the cord through the ventral roots, passing by way of rami communicantes to sympathetic ganglion system and thence following the motor nerves to the vessels of the skeletal muscles (or directly following the vessels) it tallies with the anatomical-pathological condition of this man (with left positive Babinski), that left angio-kinetic hemiplegia is an associated feature of the hemiplegia of skeletal muscles. The radialis maximum values of this case (No. 41) show that this feature of the case is observable by means of the clinical tests, *a*, *b*, *c*, *d*, and numerically expressible, which can give satisfaction and become practically usable and useful. In this connection, it should also be remembered that prolonged inactivity of the skeletal muscles must be expected to have a depressing effect upon the reflex-excitability and contractility of the muscle-cells of the tunica media of the small arteries of the affected side, perhaps also a depressing effect upon certain areas of the brain through inactivity.

The cases Nos. 42-47 permit—*mutatis mutandis*—application of similar explanation. The observation is in order that in cases Nos. 46 and 47 the radialis maximum tension is higher on the affected side. This should not cause surprise. They are cases that react well to treatment and are improving. The author has observed that in cases of hemiplegia that react well to treatment and improve the asymmetry with lower radialis maximum tension on the affected side, after some time changes, and is followed by asymmetry with the higher tension on the affected side, a development which is analogous to the physiological experience with animals of secondary vasoconstriction as after-effect to primary vasoparalysis due to cutting the nerve to a limb. The high tension on the affected side in case No. 46, is coincident with improvement in facial paralysis and is a transition, under the circumstances of this case to a subsequently renewed decrease of tension which is under the author's observation at the time when this is written.

In Case No. 47, the very high tension on the affected side, 100 m.m. higher than opposite side, is explained by the fact that it is a case

of traumatic neuritis of right arm, developing after fracture, a pain-producing affection, and as such, a source of continuous afferent excitation of pressor reflex efferent.

In Case No. 52, a girl of 14, angio-kinetic asymmetry without simultaneous involvement of skeletal muscles, was observed on the day after convulsive seizure of some unusual severity. Case 53, girl of 15, shows an example of vascular hypertonia of right half of the body, with simultaneous vascular hypotonia of the left half. Finally, No. 54, a shoemaker of 33, with emotional tone depressed, somatic, visual and auditory hallucinations, yet not abulic in marked degree, with retained insight and judgment, and not subject to outward reactions. This psychological constellation is matched by an angio-kinetic picture, including left half of the body normal, right half with unstable vascular hypertonia.

The asymmetry of functional diseases is changeable in certain cases, and the author has observed that when the vascular hypertonia is reduced, spontaneously or by therapy, to lower tension levels, the asymmetry is liable to be simultaneously reduced and to disappear gradually or rapidly.

Vascular atonia, vascular hypotonia, vascular hypertonia, vascular heterolateral ataxic dystonia, reflex angio-plegia. What is the relation of each and all of these disturbances of the angio-kinetic energy to the blood supply and functional capacity of the several organs? What is their relation to diagnosis, prognosis, therapy and prophylaxis? Answers to these questions can be developed in logical sequence by presentation of relevant facts observed, and observable again. To some extent, this will be done in subsequent chapters.

X. MULTIFARIOUS "BLOOD PRESSURE" REACTIONS THROUGH AFFERENT STIMULI OF VARIOUS KINDS AND LOCALIZATIONS.

It is a matter of physiological record, derived from laboratory experiments with animals, that electric stimuli applied to any point of the skin, or mucous, or serous membranes, organs of sense, or in fact, any point of any organ of the body produces changes in the blood pressure observable on the kymographic tracings.

However, electric stimuli are not the only ones that yield efferent blood pressure reactions. Heat, cold, atmospheric movements, pressure and humidity, light, sound, disease or

abnormal conditions of any point of any organ, or certain states of consciousness may supply the afferent stimulation which evokes blood pressure changes.

Special mention must here be made of the fact that chemical substances introduced in the blood from the outside produce "blood pressure" changes whether by exciting directly the muscle-cells of the vessel walls and the nerve-fibrils surrounding these muscle-cells, or indirectly by afferent excitation of intima transformed in the bulb to efferent pressor-reactions. Compare author's observation, Chapter VI. Similar effect results from chemical excitation of the vessel-wall through anomalous katabolic products in the blood, observed on animals by kymographic tracings (1-15).

The complications unavoidably connected with laboratory experiments upon animals and the impracticality of transplanting similar methods to the clinical field of observation has been referred to on previous pages (Chap. II). In the past, attempts have been made to determine the blood pressure of man in the opened artery at the occasion of amputations (Faire, 1856; Albert, 1883; Müller u. Bland, 1907). These methods are exposed to the critical objection that surgical shock and narcosis exert such an influence upon the blood pressure as to unavoidably preclude conclusions from such regarding the level of the blood pressure under physiological conditions. And in the absence of a fixed physiological basic value for comparison, the significance of blood pressure findings in morbid states is floating in the indefinite. Clinical observations of that nature have not increased the clarity and definiteness of our knowledge on the blood pressure in morbid states as compared with the blood pressure under physiological conditions. On the other hand, clinical observations of the variable heights of a mercury column caused by the blood pressure in the brachialis artery when it is altered through the afferent influence produced by compression of a portion of the upper arm by means of a pneumatic cuff of various descriptions have also been referred to (Chapter II), and it will be conclusively proven in a subsequent chapter (XIII) that every blood pressure measurement of such nature, save in cases of reflex angioplegia, results in values which present a state of reflex *depressor reaction of the brachialis maximum tension*.

With the aid of a test such as alluded to in

Chapter V, the author has gathered a vast material of observations which prove beyond a possibility of doubt that the so-called "blood pressure"—such as it is determined, clinically, at present—is not, in physiological sense, the *systolic maximum blood pressure*, as it is called in contradistinction to the s.c. "minimum" or *diastolic blood pressure*, but it is, in reality, a *reflex depressor reaction of the brachialis maximum tension*.

The reflex depressor reaction of the brachialis maximum tension belongs to an entirely different category of facts than the *radialis maximum tension*. The identity is different than that of the *radialis maximum tension*. Its formulation, outward characteristics, nature and inner mechanisms belong to another orbis of mental representations. There does not exist a fixed and constant coefficient which measures the difference between the *radialis maximum tension* and the *brachialis depressor reflex tension* in such a manner that the one can be computed when the other is known. Either of them can be known only through its own special methods of investigation. The conclusions within the one of these categories of representations do not apply beyond its own boundaries, as they cease to be valid if transposed within the boundaries of the other, owing to the great variability of the magnitudes of the ability indices of different cases and also of the same case during different circumstances. Any *radialis maximum value* from 130 m.m. to 320 m.m. Hg. may coexist, in a certain case, with a *depressor reflex of brachialis maximum amounting to 110-130 m.m. Hg.*, which is the so-called "normal blood pressure" in present clinical language.

Both of these sources of information—laboratory experiment on animal, and clinical depressor reaction of brachialis tension—yield results which, as has been stated above, belong to categories of facts *different* from the facts revealed through measurement of the *radialis maximum tension in physiological conditions* and in *morbid states*, comparing *basic values* and values *altered under the influence of certain definite and controllable afferent excitations*.

These observations constitute a material of facts *sui generis* representing *different inner mechanisms* than those of the other categories of facts referred to above.

Different from those other categories as are the inner mechanisms of the phenomena ob-

served and interpreted by the author of this inquiry, so these differ also as regards their *clinical significance*. The *radialis maximum tension* values are of exceedingly great significance from the *diagnostic* point of view. At present it would not be advisable to formulate diagnostic types of angio-kinetic curves or diagrams. Fifty thousand observations is a large material of facts and represents much new knowledge. Much larger material is required before the time can be ripe for publication of diagnostic formulations. But the results which the author has published during the last ten years justify his expectation that the study of this category of facts shall be continued and and practice in medicine shall be secured. expanded until their influence upon teaching

In this connection, it may interest the reader to recall to mind the fact that, although the ancient physicians, and the postgalenic school, and the physicians of the period of renaissance in science and medicine recognized increased body heat as the most important symptom (besides increased pulse-frequency) of acute disease, yet the introduction of the clinical thermometer in medical practice was a slow process. Although the first thermometer observation of the body heat was made in the thirties² of the seventeenth century (Sanctorius, Padua), it was not until the middle of the nineteenth century that clinical thermometry won general recognition in medical practice. As late as 1834 *Chomel* (quotation from Wunderlich) laid great stress upon temperature, but believed "the hand to be the only proper instrument to determine it, and that the thermometer only gave imperfect ideas of its elevation and was unable to give any indications of its special modifications."

Pierry (1838, *Traité de la diagnostique*, iii, p. 28) recognized the necessity of a measurement of the skin temperature "*dans plusieurs cas*," but his observations are often unacceptable. He found the temperature in axilla of a healthy person to be 104° Fahr., and even more; in some sick persons, temperature of 108.5° Fahr. in axilla, and 110.75° Fahr. at the epigastrium. He took temperature in 91 individuals, but only once in any single case, and his observations were in various parts of the body. "It is obviously impossible to deduce any conclusions from observations so little comparable with each

other." (Quotation from Wunderlich.) Even at that late period, the belletristic manner of arguing in this matter appears more alluring than the inductive building up of evidence as exemplified by the following meditation of *Biot* (quoted from Wunderlich): "Lorsqu'on voit tant de résultats obtenus par le seul secours d'un peu de mercure enfermé dans un tube de verre, et qu'on songe qu'on a moreau de fer suspendu sur un pivot a fait découvrir le nouveau monde, on conçoit que rien de ce qui peut agrandir et perfectionner les sens de l'homme ne doit être pris en légère considération.

To us the temperature observation in medical examination seems a matter of course, but its recognition in medical practice and teaching was not realized until about 225 years after the first thermometric measurement of the body heat was made by Sanctorius,—not until another man's single headed devotion to the cause made him successfully carry through the white man's burden in this field of scientific progress,²⁴—not until this investigator had developed diagnostic types of temperature curves supported by his millions of thermometric measurements (Wunderlich, 1840-1870)—not until the importance of exact thermometric measurements had been further emphasized by the transillumination of the discovery of the etiology of infection in the forties of the nineteenth century (Holmes, in Boston Semondweis in Vienna) (2526).

In the present paper reactions to mechanical stimuli, as described on previous pages, have supplied the material of facts upon which the study of the *radialis maximum tension* is based. These tests may be supplemented by various kinds of afferent stimuli, if cause presents itself. The author has examined many, and they have yielded interesting and—it is believed—useful information.

But the reactions represented by the three tests, *b*, *c* and *d*, give results which, in a general way reflect the information obtainable through many other tests, and for this reason the results of these three tests, compared with the basic value of test *a*, on one or both arms is to be the material of facts upon which the remaining discussion of manifestations of the angio-kinetic energy in this paper will be chiefly based. First, mention will be made of two reactions possessing particularly great significance.

TABLE III.

No.	Name	Age	Occupation	1890				1900				1910				
				a	b	c	d	a	b	c	d	a	b	c	d	
36	A. W.	17	At home					6.18	150	150	110	40	150	150	110	40
	<i>Idem.</i>							7.4	150	150	100	40	120	130	110	10
37	C. V.	38	Ex-service A. E. F.					7.28	170	200	210	130	170	180	200	130
	C. H.	59	Wife					9.14	250	280	260	160	250	280	260	160
38	G. L.	27	Bricklayer					5.11	270	270	210	70	270	270	220	50
	<i>Idem.</i>		Wife					5.24	250	250	220	50	250	250	220	50
40	M. G.	47	Laborer					2.10	250	250	200	100	180	180	160	20
41	H. P.	52	Clark					6.15	250	250	250	100	190	190	180	10
	N. L.	50	Widow					7.27	250	250	250	210	270	270	220	50
43	S. K.	50	Barber					6.24	250	250	250	190	210	210	150	40
44	N. K.	50	Matron					7.13	170	170	150	70	210	210	170	40
45	A. D.	60	Painter					6.27	360	360	350	210	260	260	220	30
46	E. Th.	53	Right Bell's palsy					6.24	320	320	320	260	300	300	250	30
			Left traumatic neuritis					10.22	270	300	300	240	30	280	250	40
			Nurse					7.23	300	300	280	210	180	180	250	180
			Widow					8.27	250	250	220	180	70	170	180	40
			Wife					8.24	250	250	270	160	70	170	220	10
			"					7.9	180	180	180	130	60	160	160	10
			Girl					8.27	180	210	210	110	80	110	120	10
			Shoe worker					8.17	180	180	220	140	50	180	180	20
			Same case No. 12, Table I.					7.12	180	180	180	140	10			

XI, XII. REACTIONS OF THE ARTERIAL TENSION RELATED TO DIAGNOSIS OF TOXEMIA AND RECOGNITION OF INCREASED INTRACRANIAL PRESSURE IN CERTAIN GROUPS OF INSANITY.

Two classes of biological reactions, biochemical and clinical-physiological, will be briefly mentioned here because of their significance for diagnostic purpose. By the aid of these reactions, toxemia can be diagnosed, and different states of intracranial pressure recognized even without manometer and lumbar puncture, in certain cases. By the aid of these reactions, the author has diagnosed toxemia in hundreds of cases of insanity, pulmonary tuberculosis and some other diseases, and also by the aid of these reactions, been able, since the year of 1913, to make hundreds of observations and approximate estimates of the intracranial pressure in certain groups of insanity. The description of these reactions must be reserved for separate articles in a Third Part, as their description necessitates presentation of a large array of facts and requires considerable space. Thereafter, a few chapters must be devoted to facts and arguments which give justification to the author's conclusion that the several more or less sudden changes in the *radialis maximum tension* values are expressions of the angio-kinetic activities which determine the magnitude of the resistances in the circulatory periphery, or, in other words, are expressions of changes in vascular tonus due to disturbances of the vascular neurons and the muscle-cells—in the tunica media of the small arteries.

LITERATURE.

¹ *ibid*, Part I. BOSTON MEDICAL AND SURGICAL JOURNAL, April 21, 1921.
² Enshke, Carl Julius: *Zeitschr. für die gesamte Neurologie und Psychiatrie*, Band xxiv, H. V.
³ *Idem*: On Vasomotor Unrest in the Insane. BOSTON MEDICAL AND SURGICAL JOURNAL, March 15, 1917.
⁴ *Idem*: A Neurological Syndrome. BOSTON MEDICAL AND SURGICAL JOURNAL, Aug. 14, 1919.
⁵ Wunderlich, C. A.: On the Temperature in Disease. *Transl.* by Woodburn, London, 1871.
⁶ Holmes, Sir William J.: *Neurosyphilis*, a Chapter in the History of Medicine. Manchester, 1909.
⁷ Holmes, Oliver Wendell: The Contagiousness of Puerperal Fever. New England Quarterly Journal of Medicine and Surgery, April, 1843.

DR. WILLIAM HEALEY, testifying before the House District Committee in Washington, claimed that untold millions would have been saved the United States if adult delinquents had received proper treatment in youth. He claimed that the cost of this omission is between two and four million dollars a day and that in Massachusetts, facilities for caring for the mentally ill are inadequate.

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SOME FEATURES OF LAW RELATING TO MEDICINE.

HOSPITAL SUPERINTENDENTS are subject to change and provisions of law relating to medical practice are sometimes overlooked or forgotten, so that it is pertinent to publish, at times, matters which may not have been given attention by administrators and practitioners. For a number of years, house officers in hospitals were in danger of prosecution for practicing medicine, because many entered upon service before securing degrees, or because of plans to practice in another state did not secure registration in Massachusetts.

In order to protect these house officers, it was thought best to provide for a limited form of registration which gave authority to practice in, and only in, a given hospital, with all the powers and responsibilities of a registered physician as applied to the work in that hospital (Section 9, Chapter 112, General Laws). This restriction seemed necessary, for otherwise these men would, under some circumstances, be led to take on work outside a hospital and might not be under the supervision of a staff. House officers are theoretically advanced students, and in the general scheme of hospital administration, are expected to give full time to study and service, more or less under direction of the staff.

Some internes fail to register, either through ignorance of the law or carelessness, and in a very few instances have shown defiance of the request of the hospital and state authorities. In one case the hospital threatened expulsion and the state officials delivered an ultimatum before an interne complied with the law.

However one may feel about the necessity of such laws, since they have been enacted, it is the part of wisdom to comply with them or offer reasons for the repeal of them. One very strong reason for compliance, aside from personal protection, lies in the provision of another law relating to the practice of medicine which renders a physician liable to prosecution and a fine, for associating himself with an unregistered physician for the purpose of carrying on the practice of medicine (Section 2, Chapter 112, General Laws).

This law was enacted for the purpose of combatting certain persons who had been convicted of violation of the medical practice acts; for in several instances, in order to carry on business, men who had been convicted and deprived of the right to practice, or in some other instances, men who had never been able to secure registration, employed licensed practitioners to act as associates and continued, in fact, to practice medicine under cover of a licensed associate.

There are several of the features of the law relating to practice and the study of medicine, which need further changes to meet present-day conditions and secure relief from the possibility of the prosecution of innocent people.

It would be unfortunate for an innocent student or practitioner to suffer prosecution for a technical violation of law, for nothing would be gained, since no one has been injured, and the effect would be to discredit the law, and no added protection of the people would be secured.

Since students depend so much upon those in authority to advise and inform them of their duties, it is incumbent on teachers of medicine and hospital authorities to require of internes compliance with the law providing for limited registration wherever such internes have not secured full registration, and to further study the law and be prepared to recommend needed legislation.

The committee of the society having matters of legislation to consider may properly confer with hospital and medical school officials and unite in a movement to correct deficiencies.

SACRIFICING THE PATIENT TO THE ADVERTISER.

To ask a physician to prescribe something as a vote of confidence in certain advertising matter and as a token of esteem for the advertiser, would probably impress most of us as a gratuitous insult to his intelligence and integrity, yet that is what was recently done by Reed and

Carnrick of Jersey City, New Jersey, manufacturers of "peptenzyme," "pancobilin," "trophonine," and "nephritin," except that they asked, not one physician, but many, to do so. And they claim that the medical profession in considerable numbers fell for it. Pardon the colloquism, but nothing short of the language of the street seems fitted aptly to express one's feelings with respect to the matter.

The incident is reported in the June issue of the *R. & C. Medical Pocket Quarterly* as follows:

"In the last issue of the *R. & C. Medical Pocket Quarterly*, we asked our friends in the medical profession for a vote of confidence in this little magazine of friendliness, as a token that they liked us for our efforts to constructively help and make them happier through its pages. We asked them to express this vote by writing at least one prescription, where indicated, from an R. & C. product, during the week following the receipt of our *Quarterly*—more, if they had the opportunity and felt extra friendly toward us and liked the little magazine a whole lot."

"The whole-hearted response you made to this call, as shown by the large increase in prescriptions written for R. & C. preparations, makes us grateful. We promised to send you a 'God bless you,' if you would give us this vote of confidence, and here it is, straight from the heart—God bless you."

If the day has come when a drug or a medicine, or an article exploited as such, is to be prescribed as a vote of confidence in an advertising magazine and of esteem for the advertiser, God help the medical profession—and the patient!

As to the value of the remedies advertised, that is another story, and is not considered here. It is deplorable that any ethical manufacturers should try to entangle physicians in questionable practices. One's conception of the Deity must be vague, if it is supposed that blessings will be bestowed upon perpetrators of this perversion of medical practice.

MASSACHUSETTS TUBERCULOSIS LEAGUE.

DR. OTIS has appointed the following Advisory Seal Sale Committee: Mr. James Jenkins, Jr., of Springfield, Dr. I. J. Clarke of Haverhill, Mrs. Mabel Greeley Smith of Cambridge, Miss Anna W. Johnson of Lawrence, Rev. Walter Greenman of Greenfield, Miss Ethel M. Spofford of Boston.

The Committee recommend that all local Seal Sale committees shall be completed by October 15. That newspaper publicity be left so far as possible to local committees.

The Executive Committee at its last meeting voted to underwrite the salary of an experi-

enced and skilled tuberculosis and survey nurse for loan to local associations wishing to do intensive work. Miss Margaret G. Howard has been employed for this work. Miss Howard for seven years served with the New York City Board of Health as tuberculosis clinic nurse. Since that time she has organized public health and child welfare nursing in Oklahoma City and in Los Angeles. Miss Howard has been engaged for the summer by the Quincy Anti-Tuberculosis Society to do the preliminary work for a tuberculosis and case finding survey in that city.

The Hampden County Tuberculosis Association has been very successful in securing donations for the support of its health camp this summer. The Tait Ice Cream Company is donating all the milk and ice cream needed. Other firms have given paint, brooms, dry goods, etc. These donations were secured in connection with a successful fund raising drive for the support of the camp. One hundred and fifty children will be accommodated, in three groups, this summer.

James Jenkins, Jr., Executive Secretary of the Hampden County Tuberculosis Association, has been appointed Chairman of the Massachusetts Campaign Committee to secure members for the National Organization for Public Health Nursing.

Miss Vepha Gardner, Head of the Out-Patient Department of the Boston Consumptives Hospital, has been appointed State Chairman for Massachusetts for the Committee on Tuberculosis Nursing for the National Organization for Public Health Nursing.

Miss O'Neil of the Southern Worcester Health Association and Miss Gallagher of the Berkshire Tuberculosis Association have both made calls for fly material.

Miss Smith of Franklin County Public Health Association has already made a tuberculosis survey of Shelburne Falls. Her Committee has sent out a circular letter to every school committee in the county urging them to purchase measuring and weighing scales in order that the examination of school children and nutrition work may be done efficiently.

PROFESSIONAL PRIDE.

MAJOR-GENERAL CLARENCE R. EDWARDS repeats the declaration that the profession of arms is the noblest profession in the world. We had an impression that it is a necessary evil, and nobility can only be applied to that purpose in the military profession which prepares itself to save people from ruthless or barbaric invasion, or preserve peace. The history of the war shows that among the proponents of this

method of dealing with nations or group of people, the most ambitious and most cruel methods are in evidence, although on one side one may find a people dedicated to the highest sacrifice. Nobody belittles the grandeur of voluntary sacrifice of life for a noble purpose, but as representatives of the motives behind the military operations in most wars the casual observer can discern the workings of minds obscured with avarice or prejudice. Some of us feel that medicine exhibits the highest type of human service, and while we are glad to render all due honor to Haig and Foch and Pershing, we are ready to have history compare Pasteur, Reed and Jenner with the Kaiser and Hindenburg and Lundendorf, and some in our own country. We would be willing to place the Mayo, Billings and Edsall in juxtaposition with all the generals of our armies in a study of character and the dominating ambitions of life. This is not meant to convey the feeling that we do not appreciate the value of the military profession, but when it is presented in a way to indicate that medicine is not being properly estimated in its relative value to this world's life, a protest is in order. We are all parts of a whole in the evolution of the race, and different activities assume prominence in public estimation according to the nature of the work in hand. Modesty is a virtue, and all professions had better leave to students of life's problems an estimate of the value of each.

MEDICAL NOTES.

DR. DAVID D. BROUH, deputy health commissioner of Boston, has resigned, and his resignation has been accepted, after a service of twenty-seven years. No public statement of the details of the controversy between the Commissioner and the Deputy, has been made. At the time of the first action of the Commissioner, many prominent physicians rallied to the support of Dr. Brouh. As we go to press, report comes that Dr. Brouh committed suicide in his apartment July 31.

THE PUBLIC HEALTH SERVICE in the Report of July 8, 1921, gives the details of disinfectant testing by the Hygienic Laboratory method. The details are too complicated for a general medical journal to publish, but laboratory workers will be interested in securing a copy for reference.

It is estimated that double the number of pellagra cases will appear this year as a result of the economic depression in producing an unfavorable effect on diet. Unless the tendency to adopt a comparatively rigid cereal diet is modified by the use of milk, cheese, lean meat, fish and fresh vegetables, serious danger exists.

DR. FREDERICK D. PARKER, 1203 Beacon Street, Brookline, has been offered the position of Senior Assistant Physician (pathology) in the Medfield State Hospital.

MISSING—Dr. William Ray Ely, a physician, disappeared from Chicago, Ill., in October, 1912. He was born in Mazon, Ill., in 1879, and is now about 42 years of age. Height 5 feet 9 inches, dark complexion, brown hair and brown eyes. Send information to Dayton & Bailey, Attorneys and Counselors at Law, 84 William Street, New York City.

VERMONT is very much concerned over the danger incident to summer camps and campers, and is making a survey of the stationary camps in order to require sanitary disposal of waste; but the itinerant camper may be less careful and harder to supervise, and yet may be a typhoid carrier. Visitors to other states should practise the golden rule. Vermont has adopted an amendment to Section 3820 of the General Laws, and under this will pay ninety-five cents for each report of a communicable disease.

BUFFALO claims to have the lowest death rate from tuberculosis among cities having over 500,000 population, and reports having had, during the past two years, 82 cases of smallpox, not a single one of which had ever been vaccinated.

THE U. S. School Bulletin says that \$50,000,000 expended annually for chewing gum, is two and a half times the total expenditure for normal schools and almost exactly the same as all state and city appropriations for higher education.

WEEK'S DEATH RATE IN BOSTON.—During the week ending July 23, 1921, the number of deaths reported was 166 against 135 last year, with a rate of 11.57 against 9.40 last year. There were 28 deaths under one year of age against 25 last year.

The number of cases of principal reportable diseases were: Diphtheria, 38; scarlet fever, 14; measles, 43; whooping cough, 5; typhoid fever, 2; tuberculosis, 57.

Included in the above were the following cases of non-residents: Diphtheria, 5; scarlet fever, 2; tuberculosis, 16.

Total deaths from these diseases were: Diphtheria, 4; scarlet fever, 2; measles, 1; tuberculosis, 18.

Included in the above were the following cases of non-residents: Diphtheria, 2; tuberculosis, 2.

TYPHOID FEVER AND CHLORINATION OF DRINKING WATER.—How a community, by too strenuous protest against an unpleasant but transl-

tory condition, can condemn itself for years to an annual recurrence of disease, is strongly brought out in a report by Dr. R. G. Perkins, of the Cleveland Division of Health, recently reprinted by the U. S. Public Health Service.

Cleveland, says the report, obtains its water through two cribs placed 4½ miles out in Lake Erie, and delivers it through two pumping stations, at one of which it is filtered and at both of which it is chlorinated.

Chlorination was begun in 1911, when the growth of the city and the increasing pollution of the lake water made treatment essential. After numerous experiments, the "dosage" of chlorine necessary to make the water safe was determined. This amount was added and the typhoid curve fell with unusual sharpness. Unfortunately, conditions compelled the delivery of the doctored water through the mains in some parts of the city so shortly after it was treated that the taste of chlorine was still apparent.

Much complaint followed, but was dying out when, early in 1912, a flood in the Cuyahoga River, which enters the lake at Cleveland, carried sewage and trade wastes out into the cribs, through which they reached the city mains. The trade wastes gave to the water an unpleasant taste, which everybody promptly blamed on the chlorination.

The mayor bent beneath the storm of protest. By his order, the "dosage" of chlorine was reduced, and during the ensuing nine years it has never been high enough, the report says, to fully counteract the ever-present pollution in the raw water.

The typhoid bacillus in drinking water is very difficult to find by laboratory methods, but the finding of sewage pollution is always considered as a warning of its possible presence.

In 1918, in the effort to better conditions, a filtration plant was put into service at the larger pumping station, which handles nearly three-fourths of the city consumption. Laboratory tests, however, show that sewage pollution is present in the unfiltered water in the city mains nearly half the time and in the filtered water from 8 to 22 per cent. of the time.

In 1918 and in 1920, when these tests showed the water to be badly polluted, the number of cases of typhoid fever in the city that could not be traced to any cause other than water, was double those that occurred in 1919, when the tests showed the water to be much better. From this the report argues that the pollution of the water and the amount of typhoid fever are directly related; and that when the pollution is reduced to a minimum, as the report says that it can be by existing facilities, typhoid fever in the city will be very greatly reduced.

It should be added that the engineer of the water division of the city, a man whose experience the report concedes to be large, finds

himself unable to admit that the untraced part of the rise of typhoid in Cleveland in the summer is due to water pollution.

THE SHEPPARD MATERNITY BILL was passed by the Senate July 23, 1921—63 to 7—and now goes to the House.

Opponents have been in attendance at hearings in Washington the past week.

COCKROACHES are not only a nauseating nuisance but they are a source of danger, for they are night prowlers and contaminate food. Dust the runways with commercial sodium fluoride mixed with equal parts of flour. A dust gun or blower will carry this powder into crevices.

THIRSTY motor travellers should not drink from the water supply in farm yards adjacent to barns or privies. If uncertain about the quality of water, use calcium hypochlorite tablets, one to a quart of water; let stand in a cool, damp place. Take one teaspoonful of the clear solution, avoiding the sediment, add to one eight-ounce glass of drinking water, allow it to stand for five minutes. It is then fit for drinking.

MISS GERTHED W. PEABODY of Cambridge, Mass., has been elected Secretary of the Massachusetts Central Health Council in place of Mr. A. W. Hedrich, resigned. Mr. Hedrich, who is Secretary of the A. P. H. A., has removed to New York City. Miss Peabody is Vice-President of the Instructive District Nursing Association of Boston.

PHYSICIANS and the laity in this state, are being circularized by the makers of Bromo-Adonis. The following report of the Propaganda Department of the A. M. A. is pertinent: "A cursory examination of 'Bromo-Adonis' made in our laboratory some time ago, indicated that it was essentially a solution of potassium bromid, containing about 29 grams in each 100 c. c. of the solution. While the circular matter stated that the preparation contained both sodium bromid and potassium bromid, a specimen examined in our laboratory proved that the sodium, if present at all was present in only small quantities. Undoubtedly, however, whatever therapeutic value this nostrum may have in the treatment of epilepsy is due to the presence of bromids."

HALF OF FEEBLE-MINDED IN MASSACHUSETTS ARE AMERICANS.—In a recent study of 100 feeble-minded families in Massachusetts, investigated by the Massachusetts Society for the Prevention of Cruelty to Children, it has been found that 48% of the families are of American parentage. The Irish are second with 13%, and the Italians third with 12%. The Irish-Americans predom-

inates in the families of mixed parentage, and the Canadian or English-Americans come second. These figures show a greater proportion of feeble-minded of foreign birth than the figures from a report of the Society in 1914. The percentage of Irish is only 7%, and of Italians, 4%, in 1914 report.

Immorality in these feeble-minded homes occurred in 58% of them, according to the later study, as against 61% in 1914. Evidences of extreme filth and bad home conditions appeared in 30% of these later homes investigated, as against 52% in the earlier report. In 47% of the families one or more persons became public charges, there being 2 families with 4 public charges, 4 with 3 public charges, and 8 with 2. In one family there were 7 feeble-minded members. In most cases where there was feeble-mindedness in the family, the mother was found to be subnormal at least. In 25% of the families the mother was proven feeble-minded, whereas only 7% of the fathers were mentally deficient. Many of these families had certain specific diseases or physical handicaps, such as a venereal disease, or a crippled body. These physical deficiencies were found in 37% of the families. A large amount of illegitimacy occurs in this type of family, 37 out of 100 families having one or more illegitimate children.

Those feeble-minded who are harmless are allowed to remain with their families under supervision, while those who are vicious or a menace to the community are segregated by commitment to the two State Schools for the feeble-minded at Waverly or Wrentham, as far as accommodations permit.

THE second clinic conducted by the Maine Public Health Association will be held at the Fairfield Sanatorium during the entire week beginning August 1st.

Dr. Edward O. Otis of Boston will discuss several of the medical phases of tuberculosis.

Dr. Samuel Ellsworth of Boston will give demonstrations of x-ray work.

Dr. Frederick Lord of the Massachusetts General Hospital will discuss "Non-Tuberculosis Diseases of the Chest."

Other men of national and international reputation in the medical profession will also be on the program, including Dr. Otto Lowry of Newark, New Jersey, who held several clinics in Maine in January of this year under the guidance of the State Department of Health.

A committee consisting of D. T. E. Hardy, Waterville, President of the State Medical Society. Dr. B. L. Bryant, Bangor, Secretary of the State Medical Society. Dr. S. J. Beach, Portland, Dr. E. G. Abbott, Portland, Miss Edith Soule, Director of Public Health Nursing and Child Hygiene, Augusta, and the State Commissioner of Health, is in charge of the arrangements for the meeting.

LIMITED REGISTRATION GRANTED BY THE MASSACHUSETTS BOARD OF REGISTRATION IN MEDICINE SINCE JUNE 1, 1921.

McConnell, William Ethelbert, Interne, Massachusetts General Hospital, 21 months.

Towleton, Fletcher Johnson, Surgical Interne,

Peter Bent Brigham Hospital, 16 months.

Blumgart, Hermann Ludwig, Medical House Officer, Peter Bent Brigham Hospital, 16 months.

Hobrecht, Carl Albert, House Officer, Massachusetts Eye and Ear Infirmary, 16 months.

Townsend, James Harvey, Interne, Massachusetts General Hospital, 2 years.

Vickers, Denver M., Surgical Interne, Peter Bent Brigham Hospital, 16 months.

Bonquet, Franklin Philip, Assistant Physician, Worcester State Hospital, 10 months.

Kontoff, Henry Arthur, Interne, Cambridge Hospital, 1 year.

Callicott, George Francis, Assistant Physician, Worcester State Hospital.

Hjort, Axel Magnus, Medical House Officer, Peter Bent Brigham Hospital, 16 months.

Lyon, Don Dee, House Officer, Peter Bent Brigham Hospital, 16 months.

Matzek, Nell Clayton, Interne, Springfield Hospital, 1 year.

Parker, George Leonard, House Officer, Springfield Hospital, 1 year.

Yerbury, Edgar Crawford, Assistant Physician, Westborough State Hospital, 1 year.

Thompson, James Braden, Resident Physician and Surgeon, Massachusetts Hahnemann Hospital, 1 year.

These physicians may only practice in the hospital designated in the certificate.

Correspondence.

"MEDICINAL BEER."

Mr. Editor:

I read with the greatest of interest the editorial in the last issue of the JOURNAL on "Medicinal Beer." I do not care particularly what Mr. Werner thinks, but I do care a good deal how the JOURNAL expresses itself and I do not agree in the slightest with the last paragraph of that editorial. The editorial states in words to the effect that, should this bill be passed and physicians given the right to prescribe beer and ale, that physicians having the license to dispense liquor would be overwhelmed by patients, friends, etc. Might I ask why would they be any more overwhelmed under those circumstances than they are now and, likewise, would it not, in your opinion, be infinitely better to prescribe beer and ale rather than to prescribe hard liquor? I know of various doctors who have told me that they did not take out a license to dispense liquor to avoid being annoyed by their friends. Personally, I think that this is a cowardly attitude. I was among the first to take out a license and in no way or shape have I been bothered by friends or patients, having let them all know my attitude in the matter.

I am one of those, and I believe that there are very many in the medical profession, who believe sincerely and honestly that for many high-strung, high-speed adult Americans beer and ale and light wine in moderation is a real and distinct benefit. I am frank in admitting that I should prescribe it to many of my patients were I allowed to do so, and I firmly believe that if the physicians were allowed to use their own judgment in prescribing beer and ale, that the situation would be distinctly improved and that the utter farce which now exists as far as the Volstead Act is concerned would not continue to exist to so great a degree.

JOHN B. HAWES, 2nd.